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ABSTRACT

This guide contains examples of cooperative projects between universities and schools currently in existence in 22 countries in which the institutions of higher education are promoting or assisting with the implementation of new information technologies in elementary and/or secondary schools. Information given for each project includes the title of the project, contact person and address, duration of the project, funding for the project, associated universities, and a description of the aims, implementation plans, and products resulting from the project. The following countries are included: Australia (14 projects); Austria (3); Belgium (11); Canada (8); Denmark (7); Finland (3); France (8); Germany (5); Ireland (4); Italy (8); Japan (6); Luxembourg (1); The Netherlands (10); New Zealand (5); Norway (9); Portugal (11); Spain (3); Sweden (10); Switzerland (3); Turkey (2); the United Kingdom (15); and the United States (5). The project descriptions are listed by the country and the name of the university and written in either English or French. (DB)

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New Information Technologies in Schools: Teacher Training, Research and the Role of Universities

Illustrative Examples of Co-operative Projects Between Universities and Schools

Exemples significatifs de projets de coopération entre les universités et les écoles

IR 015 245

May 1991

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CHARLES STURT UNIVERSITY - RIVERINA
SCHOOL OF EDUCATION

Title of project: WAGGA TECHNOLOGY HIGH SCHOOL PROJECT

Person to contact: Andrew Whelan
Lecturer
School of Education
Charles Sturt University
PO Box 588
Wagga Wagga
NSWAustralia 2650

Tel: 6922 2000 - Fax: 6922 2639

Duration: Ongoing from December 1989

Funding: Commodore Business Machines

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one upper secondary school:

- To evaluate the classroom uses of computers.

Implementation:

Aspects of the programme include:

Joint curriculum development by the school and the University through: in-service training for teachers; pooling of expertise, including staff development, to support in-service tertiary level courses; visits by school to University computer laboratories to extend the school curriculum; involvement of undergraduate students in school programs, curriculum development and teaching units; feedback to Commodore (which has supplied hardware and software) from both school and University.

The project is concerned with computer use across the curriculum, rather than with using computers to teach about computers.

Products:

Input in teacher training and in-service training courses.

CURTIN UNIVERSITY OF TECHNOLOGY
COMPUTING CENTRE

Title of project: NON-GOVERNMENT SCHOOLS COMPUTING CENTRE

Person to contact:
John Winship
Acting Director
Computer Centre
Curtin University of Technology
GPO U1987
Perth WA 6001, Australia

Tel. 61 9 351 7431 - Fax: 61 9 351 2673

Duration: Ongoing from 1984

Funding:
- 1984-1986: Commonwealth of Australia Computer Education Program
- Since 1987: User-Pays basis and subsidies from Western Australia, Educational Computing Consortium.

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary, lower and upper secondary non-Government schools of Western Australia:

- To provide teacher education on the use of the computer across the curriculum.

Implementation:

The non-Government Schools Computing Centre is a resource and in-service training centre for teachers. An extensive library of software packages has been built up and programmes of in-service training based on the use of software developed. Courses have covered and continue to cover not just introductory computer literacy, but also courses and seminars in the use of computers in a wide range of subject areas. Since 1984 over two thousand teachers from the ninety-one non-Government secondary schools have attended courses at the Centre. In addition, a number of courses have been conducted in non-metropolitan locations.

The Centre has also worked with individual schools on a number of small scale projects which they have proposed . Typical projects included the development of school based activities using Computer Aided Design, computer graphics, word processing and a variety of Computer Based Learning software packages.

Products:

The Centre is now the only in-service and resource centre available in Western Australia for teachers in both Government and non-Government schools. It includes a clearinghouse of information about software, training teachers in software review and the setting up a vidéo database: "The Schools Competing On-line Resources" (SCOR) database, on the mainframes of the University.

An extensive library of software.

GRIFFITH UNIVERSITY
DIVISION OF EDUCATION

Title of project: COMPUTERS AND HIGHER ORDER THINKING SKILLS

Person to contact: Cathie Sherwood,
Lecturer
Division of Education
Griffith University
Nathan
Queensland, 4111, Australia
Tel: 7 875 7111 - Fax: 7 875 7965

Duration: From February 1989 to June 1990

Funding:
- Queensland Department of Education and Jacaranda Software (for software)
- Schools (for hardware)

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two primary schools:

To investigate the role the computer and adventure game software can play in providing opportunities for students to engage in higher order thinking processes.

Implementation:

Emphasis is on the learner's capacity to adapt to change and foster abilities in decision-making, problem-solving and other higher order thinking skills which will enable them to think for themselves and transfer these skills effectively from one subject to another. Adventure games were used as a means, rather than LOGO and other programming languages or drill and practice software concentrating on the acquisition of knowledge. The Project studied: to what extent children use higher order thinking skills to solve problems and puzzles in computer adventure games; what teaching and learning strategies could be employed by the teachers to aid their students; whether the age, the gender mix or the number of students at the computer facilitated a higher degree of thinking; collaboration between students at the computer and the implications for curriculum development of the integration of the microcomputer into the classroom.

The teachers and the researchers focused on classrooms as social environments for learning, providing independent inquiry, co-operation, and creative expression. They thus changed from teacher-centred to student-centred, inquiry-based environments.

Products:

Information technology courses in the pre-service and in-service teacher education programme of Griffith University.

Final report February 1991

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND
MULTIMEDIA LABORATORY

Title of project: THE REMOTE AREA TEACHER EDUCATION PROJECT (RATEP)

Person to contact: Maria Macindoe
Multimedia Laboratory
Department of Social and Cultural Studies in Education
James Cook University
Townsville Q 4811, Australia

Tel: 61 77 81 41 15 – Fax: 61 77 25 15 94

Duration: From January 1990 to July 1992

Funding:
- Queensland Open Learning Project
- DEET

Associated Universities:
- Queensland University of Technology
- Cairns College of Technical and Further Education

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four state schools:

- To enable adults to upgrade their Associate Diploma in Community Teaching to a Diploma of Teaching in Primary Education.

Implementation:

The Remote Area Teacher Education Project is a complex configuration of people and institutions whose brief is to prepare and deliver higher education teacher education courses via information technology to Aboriginal and Torres Strait Islander students on-site in remote locations, thus obviating the need for students to leave family and community support networks.

Preparation and delivery of the course is based on the use of multimedia information technology to provide teaching and learning materials that are interesting, varied, interactive and culturally appropriate in language and content. The RATEP courses are currently being prepared at the three co-operating universities. The technology is centred on the Macintosh computer and an authoring language called Authorware Professional.

RATEP is part of the Queensland Open Learning Centre Network, a State Government initiative to test the viability of using information technology to create and deliver higher education to Queenslanders. It will provide a sequence consisting of a one-year certificate, a two-year Associate Diploma, a three-year Diploma in Teaching, and, ultimately, a four-year Degree.

Products:

Final report December 1992.

UNIVERSITY OF MELBOURNE
SCHOOL OF SCIENCE AND MATHEMATICS EDUCATION

Title of project: LEGO - LOGO: KALINDA PRIMARY SCHOOL

Person to contact: Alan Bartram
School of Science and Mathematics Education
Institute of Education
University of Melbourne
ParkvilleVictoria 3052, Australia

Duration: Ongoing from August 1990

Funding:
- Univeristy of Melbourne
- Ministry of Education, Victoria
- Kalinda Primary School

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one primary school:

- To study the effects LEGO-LOGO has on childrens' (girls in particular) attitudes towards and skills in technology;
- To implement LEGO-LOGO as an integral component of the school curriculum.

Implementation:

The project purchased and organised the resources to operate programs. One member of staff was trained in LEGO-LOGO programming. At the onset, a questionnaire was filmed investigating the entry skills and attitudes of the children. The program commenced for a group of year 5 children and the place of LEGO-LOGO in the school program (level, programs, resource needs) was investigated.

The monitoring of the project involved a video film recording of the exit skills and attitudes of the pupils.

Products:

A video and report of the program was produced to meet the requirements of the "seed" grant funding.

Final report June 1991.

MONASH UNIVERSTY
FACULTY OF EDUCATION

Title of Project:	CROSS-SECTORIAL TELEMATIC NETWORK PROJECT
Person to contact:	Suzanne Mcnammara Faculty of Education Monash University Rialto Towers Collins Street Melbourne VIC 3000, Australia
Duration:	From August 1990 to December 1990
Funding:	Victorian Ministry of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In rural primary and secondary schools, technical and further education colleges, statewide in Victoria:

- To provide professional development support to existing and potential users of telematics within all sectors of the Ministry of Education;
- To create links between sectors for the purpose of resource sharing and development.

Implementation:

The project brief is to identify issues associated with cross sectorial resource sharing, provide strategies for facilitating resource sharing and develop policy and structures which will enable the maintenance and efficient usage of the various telematics features and approaches.

Project officers are located in different regions of the state of Victoria. They are responsible for data collection, conduct of professional development, technical support and promotion of the approaches and the development of the documentation associated with the project. Meetings occur weekly via teleconferencing, and include data transfer.

The project is derived from the policy and planning division/schools program division of the Ministry of Education.

Products:

Final report December 1990

UNIVERSITY OF NEWCASTLE
SPECIAL EDUCATION CENTRE

Title of project:	**DEVELOPMENT OF COMPUTER-BASED INSTRUCTIONAL PROGRAMS FOR CHILDREN WITH DISABILITIES**
Person to contact:	Dr. Philip J. Foreman Director Special Education Centre University of Newcastle, New South Wales NSW 2308, Australia Tel: 49 685 360 - Fax: 49 675 833
Duration:	From June 1990 to December 1991
Funding:	– Commonwealth Government (DEET) – University of Newcastle
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary and secondary education:

- To develop and evaluate systems for establishing computer-based instructional programs in educational content areas relevant to people with special education needs;
- To develop instructional authoring systems which allow educators with no expertise in computer programming to develop software.

Implementation:

At least in the early stages, most of the teachers will be special educators. A series of discrete research studies will evaluate existing authoring systems and commercial software, develop authoring systems appropriate to the systematic teaching of academic skills and functional academics, and evaluate the use of those teaching programs with children with learning difficulties.

Schools have not yet been identified.

Products:

Final report April 1992.

UNIVERSITY OF NEW ENGLAND
CENTRE FOR RESEARCH ON INFORMATION TECHNOLOGY IN EDUCATION

Title of project: COMPUTER SUPPORT FOR PROBLEM AREAS IN MATHEMATICS, LANGUAGE AND SCIENCE FROM KINDERGARTEN TO YEAR EIGHT

Person to contact: Professor Don Fitzgerald
Director of CRITE
University of New England
Armidale 2351 NSW, Australia
Tel: 67.73 42 03 - Fax: 67 72 97 02

Duration: From February 1990 to 1992+ (long-term project)

Funding: Toshiba Australia

Associated Universities: Australian Catholic University (Signadou Campus)

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In pre-primary, primary and lower secondary education:

- To survey teachers in all parts of New South Wales, in mathematics, science and language;
- To examine the problems students have in the areas of mathematics and language.

Implementation:

The research program has two distinct phases:

First Phase: To consider areas of the curriculum that present problems for students up to and including year 8. A sample of "expert" teachers have been asked to complete a questionnaire in order to examine their perceptions of the problems students have in the areas of mathematics and language. It is hoped that, by surveying the opinions of a relatively large number of experienced teachers, the areas of the curriculum that present problems for students will be identified.

Second Phase: To develop "intelligent" software for a number of topics, identified as problem areas in phase one. The software will be intelligent in the sense that it will attempt to model the information processing skills of children through an initial series of games and subsequently provide a learning environment appropriate for the child's profile of skills. In addition, the software will record the patterns of performance of the individual child and adapt subsequent learning tasks to prior performance. The "mental models" that will form the basis of this research have been developed from psychometric research on children's information processing skills conducted at the University of New England.

Products:

The outcomes of the study will be made available to the State Department of Education. Interim report on phase one of the project, November 1990.

NORTHERN TERRITORY UNIVERSITY

Title of project: NORTHERN TERRITORY COMPUTER EDUCATION CENTRE

Person to contact: Robert Chirgwin
Northern Territory University
PO Box 40146
Casuarina NT 0811, Australia

Duration: Ongoing from January 1987

Funding:
- Northern Territory University
- Northern Territory Education Department

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In all schools in the Northern Territory, pre-primary, primary, junior and senior secondary:

- To develop in trainee teachers: the skills necessary to use appropriate new information technologies as an aid to their studies; knowledge of the pedagogical uses of computers; experience of using new information technologies, including computer hardware, software and peripherals of the same types that are used in schools;
- To provide practising teachers with training in the use of new information technologies in schools.

Implementation:

Trainee teachers are provided with the training through formal award courses. In service teachers are trained through non award short courses. Both trainee teachers and practising teachers receive instruction on the same equipment as that used by children in schools, and are taught by the advisers who visit schools to assist with the planning and development of school new technology resources. The same advisers are involved in curriculum and policy development.

In addition, the Centre: undertakes research into the applicability of emerging technologies to education; reviews new computing software and advises teachers on developments; assists with the development of post-graduate awards for trainee and practising teachers. The Centre is housed within the University and is a part of its formal structure.

Products:

The project has a direct link to the Northern Territory Education Department policy-making process and as such provides input into the development of new information technologies policy in schools.

Annual reports.

UNIVERSITY COLLEGE OF CENTRAL QUEENSLAND
SCHOOL OF EDUCATION

Title of project: **TALKING WORD PROCESSORS AND TEXT EDITING FOR VISUALLY IMPAIRED CHILDREN : A CASE STUDY**

Person to contact: Peter Hallinan
School of Education
University College of Central Queensland
Rockhampton
Qld 4702, Australia

Tel: 79 36 07 77 - Fax: 79 36 13 61

Duration: From July to December 1987

Funding: University College of Central Queensland

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

At a State primary school (in a special education unit - in this case, visual impairment):

- To investigate the use of talking word processors and text editing for visually impaired children.

Implementation:

An Amiga 500 micro-computer with a talking word processor was installed in a special education unit, for use by a visually impaired pupil, over two school terms.

The project was initiated by the University, following negotiations with the teachers, the parents and the student concerned.

It was viewed as a pilot case study, and the forthcoming paper reviews the challenges and limitations posed by the introduction of new technology.

Products:

Final report in the Journal of Visual Impairment and Blindness.

UNIVERSITY OF SYDNEY
SCHOOL OF TEACHING AND CURRICULUM STUDIES

Title of project: TOSHIBA MATERIALS DEVELOPMENT

Person to contact: Dr. M.M. King
Senior Lecturer
School of Teaching and Curriculum Studies
Faculty of Education
The University of Sydney
NSW 2006, Australia

Duration: From July 1990 to 1992

Funding: Toshiba Australia, Sydney

Associated Universities: – University of New England (Centre for Research on Information Technology in Education)

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary, lower and upper secondary schools in Australian Capital Territory and New South Wales:

– To develop interactive problem solving software in the areas of science, mathematics and English to be used in conjunction with the develoment of environmental probes designed by the project team.

Implementation:

Different schools will be used for different parts of the project.

The development of the Project will take full advantage of the use of portable laptop equipment with the potential for both home and school links and out of classroom use.

The Project is led by the two Universities and Toshiba Australia.

Products:

Software packages.

UNIVERSITY OF TECHNOLOGY, SYDNEY
SCHOOL OF TEACHER EDUCATION

Title of project:	**INNOVATION IN TECHNOLOGY EDUCATION**
Person to contact:	Prof. Mark Cosgrove School of Teacher Education University of Technology, Sydney Kuring-gai Campus PO Box 123 Broadway, NSW 2007, Australia Tel: 61 2 218 9104 - Fax: 61 2 281 2498
Duration:	Ongoing from October 1990
Funding:	– North West Region, New South Wales, Department of School Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In an upper secondary school:

– To develop the school curriculum, using the most modern new information technologies.

Implementation:

The project is essentially a curriculum development operation in which teachers will try to use the most modern techniques of teaching with the most modern equipment available. The intent is to bring the students to a state of learning whereby techniques such as robotics become part of the classroom environment.

The organisation of the project is through consultation. Several one day workshops will be operated for teachers using research-based curriculum packages developed at the University.

Products:

Curriculum development.

UNIVERSITY OF WESTERN AUSTRALIA
CENTRE FOR RESEARCH ON RURAL EDUCATION

Title of project:	**COMPUTER-BASED DELIVERY OF EARLY EDUCATION IN NUMERACY AND LITERACY FOR CHILDREN OF ITINERANT FAMILIES**
Person to contact:	Prof. Ian Birch, Dr. Mike Lally University of Western Australia Department of Education The Rural Education Research Centre Nedlands WA, Western Australia 6009 Tel. (9) 380 3838
Duration:	From December 1988 to January 1991
Funding:	– Bernard van Leer Foundation of the Netherlands – University of Western Australia
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In six schools, pre-primary to Year 3:

– To use computer technology together with telecommunication to provide some continuity for early education in reading, writing and numeracy in children in their early years who come from families which are itinerant.

Implementation:

All the schools, equipped with computer and modem, are located in the north-eastern goldfields of Western Australia where the population is largely itinerant. Educational programs are presented via the computer, and names of children, together with their school results are maintained as part of a computer day file. This information is sent to a central computer at the University once a week. When a child moves from one school to another, that child's name and track record are moved from one section of the database to that associated with the school to which the child is moving.

A large number of students involved in the project come from an Aboriginal background; therefore, many of the programs have been written using a context which is familar and culturally relevant to those children, e.g. numeracy games are based on hunting a kangaroo. The same concepts are taught to non-Aboriginal children using a game of either moving sheep into a yard or finding a nugget in a gold mine. A considerable number of programs have been developed covering the areas of reading, writing and numeracy.

Products:

Approximately 40 different programs have been developed over the three year span of the project. Final report January 1991.

UNIVERSITY OF WESTERN SYDNEY, MACARTHUR
SCHOOL OF EDUCATION AND LANGUAGE STUDIES

Title of project: INFORMATION SKILLS AND TECHNOLOGIES

Person to contact:
Toni Downes
Senior Lecturer
School of Education and Language Studies
University of Western Sydney, Macarthur
Post Office Box 555
Campbelltown NSW 2560, Australia

Duration: From August 1989 to December 1991

Funding:
- University Research Grant
- Apple Australia (equipment loan)

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In three primary schools, two government and one non-government, in the suburbs of Sydney:

To evaluate the use of computerised data systems as an information processing tool in the physical science curriculum and to provide curriculum guidelines and ideas for teachers;

To contribute to knowledge about primary-age students' information handling skills and identify the key factors which maximise or lessen the utility of computerised data-base systems in the classroom;

To provide software specifications.

Implementation:

The information processes that students use will be indentified and analysed in terms of the capabilities of current technologies found in classrooms. Key factors which affect the use of these systems will also be investigated (management of teaching, including resources; the students' learning processes; the task at hand; the features and functions of the available technology).

The basic methodology of the project is the case study. A number of primary classrooms will be studied, with data being collected by interviews, observations, questionnaires and the gathering of pertinent artifacts (e.g. examples of students' work). In 1990, a group of classrooms will investigate weather patterns, using (for different classes): Mac with EXCEL, Apple II with Fredbase software: BBCs and a suite of software from England. This configuration of software signals a second phase in the project where the capabilities of available software can be investigated in terms of student needs.

Products:

Final report December 1992.

Austria

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UNIVERSITY OF KLAGENFURT
INSTITUTE OF MATHEMATICS

Title of project:	**DEVELOPMENT AND EVALUATION OF MICRO-WORLDS IN MATHEMATICS TEACHING**
Person to contact:	Dr. Gerd Kadunz Institute of Mathematics University of Klagenfurt Universitätsstr. 65-67 A-9022 Klagenfurt, Austria
Duration:	From June 1987 to June 1991
Funding:	University of Klagenfurt
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one lower and upper secondary school (10-14 years)

- To develop an user-friendly and object-oriented software with emphasis on the process of drawing for teaching geometry (not geometric drawing).

Implementation:

The project will concentrate on:

- Application of constructions in geometry for lower secondary level students;
- Presentation of assumptions in geometric configurations in the sense of an operative principle by interactive variation of graphs and figures;
- Inductive problem-solving;
- Experimental search for problem-solving strategies;
- Decision support by the means of demonstration and visualisation.

Products:

Final report June 1991.

UNIVERSITY OF KLAGENFURT
INSTITUTE OF MATHEMATICS

Title of project: SYSTEM DYNAMICS IN MATHEMATICS COURSES IN SECONDARY SCHOOLS

Person to contact: Dr. Günther Ossimitz
University of Klagenfurt
Institute of Mathematics
Universitätsstr. 65,
A-9020 Klagenfurt, Austria

Duration: From January 1989 to August 1990

Funding: University of Klagenfurt

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one upper secondary school

- To develop and partly evaluate practical materials for teaching system dynamics.

Implementation:

The materials consisted mainly of modelling examples, background information about the modelling process, and a software economics environment for computer simulations. Most of the models were designed for numerical simulation on computers (MS-DOS PC) with various software products (DYNAMO-like simulation software, spreadsheets); some models were designed for mere qualitative modelling without computer aids.

One major task was to explore how different ways of denoting dynamic models (verbal, graphical, numerical representations), could be used for generating new insights into the dynamic behaviour of the modelled issue. It was found that qualitative modelling needs representations different from quantative modelling.

Practical teaching experiments made the completed materials suitable and convenient for teaching. The threshold for teachers to enter the new field of teaching system dynamics was made as low as possible.

The project is a result of a recent reform of the mathematics curriculum, which introduced system dynamics as a new component in Grade 11 (16-17 years) of the "Realgymnasium".

Products:

Report published: Ossimitz G. (1990): Materialen zur Systemdynamik. Wien: Hölder-Pichler-Tempsky.

VIENNA TECHNICAL UNIVERSITY
INSTITUTE FOR INFORMATICS APPLICATION

Title of project: LEARNING WITH COMPUTERS - FUNCTIONS AND GRAPHS

Person to contact: Dr. Eveline Riedling
Vienna Technical University
Institute for Informatics Application
Resselgasse 3A
A-1040 Wien, Austria

Tel. 58801-0

Duration: From January 1988 to April 1990

Funding:
- Ministry of Education
- Ministry of Science and Research

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one school, primary and lower secondary:

- To identify the learning processes which occur in computer aided learning in mathematics.

Implementation:

The research concentrates on the specific contribution the computer can make to stimulate childrens' learning, so that computers can be used most efficiently. The second feature of the project, therefore, is the evaluation of software, to identify the types which specifically stimulate childrens' learning processes. The software was selected by the project manager, and the development itself was done by the students.

A report on the program is being made by the children themselves - stating new, exciting, difficult, motivating or frustrating learning events which occurred during the program sessions. The final report identifies more precisely efficient types of programs; helpful combinations of different types of software, difficulties in some sorts of knowledged-representations in programs and the outcomes of the learning process.

Products:

Final report May 1990.

Belgium

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UNIVERSITE LIBRE DE BRUXELLES
CENTRE UNIVERSITAIRE D'ETAT DE GAND
UNIVERSITE CATHOLIQUE DE LOUVAIN
CENTRE UNIVERSITAIRE DE LIMBOURG

Titre du projet : UN ORDINATEUR DANS LA CLASSE

Personne à contacter :
Hugo Buermans
Directeur
Kunstlaan 43
1040 - Bruxelles, Belgique
Tél. 2/513 74 64

Durée : En cours depuis février 1988

Financement : Ministère de l'Enseignement

Autres partenaires : par
- Ministère de l'enseignement (Service de l'Enseignement Correspondance et Service Média et Technologie)
- Enseignement de l'Etat
- Enseignemnt communal
- Enseignement provincial
- Enseignement catholique
- Service Instructif de la Télévision publique.

BRIEF DESCRIPTION OF THE PROJECT

Objectifs :

Améliorer la formation multimédia du corps professoral (soit plus de 70 000 personnes) de toutes les écoles (6 000) de la Communauté flamande de Belgique.

Mise en oeuvre :

Le cours est composé de trois supports :

- Trois manuels axés sur l'auto-formation et l'auto-évaluation qui visent à : faire connaître l'informatique comme instrument pédagogique ; démontrer son usage éducatif dans les matières traditionnelles et présenter la valeur de l'utilisation du logiciel et du matériel.
- 16 émissions de télévision de la Radio et Télévision Flamande illustrent le contenu des manuels.
- Des Centres de pratiques qui comptent 40 écoles ayant mis leurs équipements informatiques à la disposition des enseignants.

Produits :

Les manuels sont distribués gratuitement aux enseignants.

STATE UNIVERSITY OF GHENT
EDUCATIONAL INFORMATION SCIENCES (EDIF)

Title of project: PRIMARY SCHOOL TEACHER EDUCATION IN NEW INFORMATION TECHNOLOGIES

Person to contact: Prof. Dr. G. Schuyten
State University of Ghent
Department of Education
H. Dunantlaan 1
B-9000 Ghent, Belgium
Tel: (91) 25 41 00 – Fax: (91) 23 24 72

Duration: From 1985 to present

Funding:
- Ministry of Education
- EDIF

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aim:

- To provide primary school teacher education in computer applications and particularly in the use of LOGO-microworlds.

Implementation

Between 1985-89, four "action-research oriented" projects were set up, each involving 40 teachers from seven elementary schools in Ghent. The objectives were the development of: mathematical concepts and skills of pupils; computer literacy of teachers; ability of teachers to use the new tools to pursue mathematical objectives; ability of the teachers to rethink approaches to teaching and learning in primary school, using a "constructivist" approach.

Teacher education courses involved: introduction to LOGO; the relation between LOGO and the mathematics curriculum; the use of microworlds in daily teaching practice and the acquisition of the necessary skills to integrate this new knowledge into teaching practice.

Products:

The EDIF team played a major role in Flanders in the preparation of the national Plan to introduce computers in State primary schools and in the organisation of a compulsory in-service programme for all primary school teachers (started in 1990), especially in relation to the use of LOGO-based learning environments.

The role of the University is now restricted to the development of teacher training materials or software packages.

UNIVERSITY OF LEUVEN
CENTER FOR INSTRUCTIONAL PSYCHOLOGY

Title of project: **DEVELOPMENT OF THINKING SKILLS THROUGH COMPUTER LEARNING ENVIRONMENTS**

Person to contact: Prof. Dr. E.rick De Corte
University of Leuven
Department of Education, CIT
Vesaliusstraat 2
B-3000 Leuven, Belgium
Tel. 16/28 62 03

Duration: From January 1990 to September 1990

Funding: Ministry of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To train, in primary schools in the provinces of Brabant and Antwerpen, a group of 5th and 6th grade teachers (who had followed an introductory course in LOGO) in the application of LOGO for developing thinking skills in chidren.

Implementation:

This was accomplished on the basis of the know-how acquired in the past few years in the Center for Instructional Psychology in the project "Computers and Thinking". A powerful teaching/learning environment was constructed, aiming at the acquision of the basic concepts of LOGO and the mastery of thinking skills that are characteristic of good programming, as well as the transfer of these skills to other domains.

A series of training sessions was organised. Each session involved two parts. In the first, more theoretical part, the know-how developed in the research center was shared with the teachers. In a practically oriented part, the teachers had ample opportunity to practise and discuss the newly learned material at the computer.

Products:

A handbook for teachers who plan to use LOGO in their classroom was compiled.

CATHOLIC UNIVERSITY OF LEUVEN
DIDACTICS OF PHYSICS DIVISION

Title of project:	USE OF MICROCOMPUTERS IN SCIENCE TEACHING
Person to contact:	Prof. Dr. Ir. R. Boving Catholic University of Leuven Didactics of Physics Division Naamestraat 61 B-32000 Leuven, Belgium Tel: 32 11 22 9981
Duration:	From September 1987 to August 1990
Funding:	Ministry of Education
Associated Universities:	Limburgs University Centre, Belgium

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In lower and upper secondary education:

- To train teachers in the use of the microcomputer in the teaching of biology, chemistry and physics;
- To produce new software;
- To develop an interface to use the microcomputer in scientific experiments.

Implementation:

The course was implemented through teacher training in didactics and informatics. Frequent meetings were organised between researchers and teachers.

Products:

New software progams for use in teaching. Increased interface capacity for the use of computers in practical experiments.

Final report January 1991.

UNIVERSITE DE LIEGE
SERVICE DE TECHNOLOGIE DE L'EDUCATION

Titre du projet:	**L'INFORMATIQUE TRANQUILLE - L'INTRODUCTION DES NTI DANS L'ENSEIGNEMENT PRIMAIRE**
Personne à contacter :	Professeur D. Leclercq Faculté de Psychologie et des Sciences de l'Education Sart Tilman, Bâtiment B32 4000 Liège, Belgique Tél. (41) 56 20 72
Durée :	De janvier 1987 à décembre 1988
Financement :	Commission des Communautés Européennes Task Force : Ressources humaines, éducation, formation et jeunesse
Universités associées :	– Université de Loughborough, Royaume-Uni – Centre d'Enseignement à Distance, France

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Décrire l'évolution du processus d'introduction d'utilisations pédagogiques de l'ordinateur dans des écoles primaires qui n'y avaient jamais eu recours, par des enseignants n'en ayant pas l'expérience. Dans ce projet de coopération internationale, il a été décidé de "suivre" une école en Belgique, une en France et une en Angleterre.

Mise en oeuvre:

Trois thèmes de recherche ont été retenus et partagés entre les pays participants :

- *Belgique*. "Comment les enseignants se préparent-ils ? Comment réorganisent-ils leurs cours ?"
- *Royaume-Uni*. "Quelle est l'activité des enfants, leurs acquis en connaissances et en comportements ?"
- *France*. "Quel est le rôle de l'environnement sociologique ?"

Diverses méthodes de formation des enseignants ont été mises en oeuvre. Dans chaque cas, les enseignants ont été maîtres de leurs décisions concernant le type d'utilisation pédagogique. Les équipes universitaires étaient là pour répondre aux questions, fournir du matériel et des logiciels et pour observer le déroulement de la formation.

Produits:

Un ouvrage de S. Osterieth : "L'informatique tranquille", édité par l'Organisation des Etudes (1990) ; "Coming to terms with computers in three countries" (version anglaise), ainsi que divers rapports plus pointus sur des aspects particuliers.

UNIVERSITE DE LIEGE
SERVICE DE TECHNOLOGIE DE L'EDUCATION

Titre du projet : ENVIRONNEMENTS D'APPRENTISSAGE

Volet a) – Seminaires LOGO itinérants
Volet b) – Robotique itinérante
Volet c) – Etude des intéractions maître-élèves

Personne à contacter : Professeur D. Leclerq
Faculté de Psychologie et des Sciences de l'Education
Sart Tilman, Bâtiment B32
4000 Liège, Belgique

Tél. (41) 56 20 72

Durée : Volet a) – Octobre 1982 – Juin 1983
Volet b) – Janvier 1990 – Octobre 1990
Volet c) – Octobre 1982 – Juin 1990

Financement : Ministère de l'Enseignement (Secteur francophone)

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

a) Faire acquérir par des élèves de l'enseignement primaire (notamment des quartiers défavorisés) une certaine culture informatique.
b) Former des enseignants pour introduire la robotique pédagogique dans l'enseignement primaire et pré- primaire, afin de motiver chez les jeunes l'utilisation ultérieure des techniques de pointe.
c) Etudier les interventions des enseignants afin de réguler leur pratique pour qu'ils soient conscients de l'impact de leur action éducative.

Mise en oeuvre:

Les chercheurs forment les enseignants qui restent des "décideurs". Ils étudient leur réalisme et leur efficacité et dégagent les difficultés et les obstacles dans leur mise en oeuvre d'une activité robotique et/ou informatique.

Pour cela, on organise la formation des enseignants à LOGO et à la robotique, en les accompagnant sur le terrain du point de vue pédagogique et on observe et on analyse leurs activités.

Produits

Rapport final juin 1990.

UNIVERSITE DE LIEGE
SERVICE DE TECHNOLOGIE DE L'EDUCATION

Titre du projet: **BANQUE DE QUESTIONS POUR LES ÉCOLES TECHNIQUES DE LA FORCE AÉRIENNE BELGE**

Personne à contacter : Professeur D. Leclercq
Faculté de Psychologie et des Sciences de l'Education
Sart Tilman, Bâtiment B32
4000 Liège, Belgique

Tél. (41) 56 20 72

Durée : En cours depuis 1971

Financement : Défense nationale

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Constitution d'une banque de questions à choix multiple.

Mise en oeuvre:

L'école technique de la Force Aérienne Belge située à Saffraanberg et agissant comme Centre de coordination a défini avec les professeurs des dix autres écoles techniques les thèmes pour chaque branche d'activité (e.g. electricité, electronique, mécanique etc. et toutes les disciplines de base). Le Centre examine les questions que les professeurs leur envoient. Il les encode, les traduit dans les deux autres langues (le Français, le Néerlandais et l'Anglais étant les trois langues de travail), et publie périodiquement un fichier destiné aux professeurs de la même spécialité.

Produits:

Actuellement, la banque contient plus de 20 000 questions.

UNIVERSITE DE MONS
UNITE DE TECHNOLOGIE DE L'EDUCATION

Titre du projet : ETUDE DES MODALITES D'EXPLOITATION PEDAGOGIQUE DE CERTAINS PROGICIELS SPECIALISES

Personne à contacter : Professeur Christian Depover
Université de Mons
Faculté des Sciences psycho-pédagogiques
21, place du Parc
7000 Mons, Belgique

Tél. (32) 65 37 31 22

Durée : De décembre 1989 à novembre 1990

Financement : Ministère de l'enseignement de la Communauté française de Belgique

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans cinq écoles primaires, le projet vise à :

- Mettre au point des situations d'apprentissage exploitant les diverses ressources de progiciels specialisés (tableurs, traitement de textes, bases de données), et déterminer les démarches méthodologiques permettant l'exploitation optimale des outils créés (fiches-outils).

Mise en oeuvre :

L'expérimentation des méthodologies proposées et des outils retenus nécessite, d'une part, la formation des enseignants à l'utilisation pédagogique des progiciels et, d'autre part, l'application des exercices mis au point dans les classes, à la fois par les enseignants et les chercheurs.

Produits :

Rapport final en novembre 1990.

UNIVERSITE DE MONS
UNITÉ DE TECHNOLOGIE DE L'ÉDUCATION

Titre du projet : SYMUL-METAL PROTECT

Personne à contacter : Professeur Christian Depover
Université de Mons
Faculté des Sciences psycho-pédagogiques
21, place du Parc
7000 Mons, Belgique
Tel. (32) 65 37 31 17 - Fax (32) 65 37 30 54

Durée : D'avril 1989 à septembre 1993

Financement :
- Centre d'Information des Métaux Non Ferreux,
- Partenaires industriels : ACEC-UM, Asturia de Zinc, Centre du Zinc,
- Projet COMETT

Universités associées :
- Université de Valenciennes, Institut de formation et de recherche pédagogique
- Instituto do Emprego e formaçao profissional, Lisbonne, Portugal.

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Phase 1: Concevoir un système matériel et logiciel de formation multimédia (ordinateur et vidéodisque) aux concepts de bases liés à la corrosion et à l'anticorrosion.

Phase 2: Utiliser ce logiciel dans la formation de professeurs de l'enseignement secondaire supérieur technique et implémenter le logiciel dans des écoles pilotes.

Mise en oeuvre :

SYMUL-METAL PROJECT est un cours de formation assisté par vidéodisque interactif qui sera composé de quatre modules :

- Un module d'apprentissage ayant pour ambition d'amener l'apprenant à comprendre le mécanisme de la corrosion ; les phénomènes chimiques sont présentés à partir de simulation d'expériences ;
- Un module qui permet à l'apprenant de se familiariser avec les techniques modernes utilisées dans la lutte contre la corrosion ;
- Deux modules qui s'adresseront à des apprenants expérimentés. Ils les conduiront à maîtriser et à choisir la technologie appropriée en fonction de la situation et de la nature des pièces à protéger.

Le projet inclut la mise en oeuvre des deux premiers modules dans le cadre d'action de formation des enseignants et ensuite, de leurs étudiants.

Produits :

Un système matériel et logiciel de formation multi-média.

FACULTES UNIVERSITAIRES NOTRE-DAME DE LA PAIX
DÉPARTEMENT EDUCATION ET TECHNOLOGIE

Titre du projet	**FORMATION D'ENSEIGNANTS AU DEVELOPPEMENT DE SCENARII D'INTEGRATION DES LOGICIELS D'APPLICATION COMME OUTILS D'APPRENTISSAGE DANS L'ENSEIGNEMENT DES SCIENCES**
Personne à contacter :	J. Brüll-Guillaume Facultés Universitaires Notre-Dame de la Paix 61, rue de Bruxelles 5000 Namur, Belgique Tél. (81) 229 061
Durée :	De mai 1987 à juin 1988
Financement :	Ministère de l'Education Nationale
Universités associées :	Néant.

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Pour les enseignants des écoles secondaires et techniques de la Communauté Française de Belgique :

1. Initiation aux notions de base de l'informatique et à l'utilisation des progiciels ;
2. Recherche des modalités d'intégration de l'outil dans les cours de sciences ;
3. Capacité d'opérer au niveau de la méthodologie des cours de sciences pour pouvoir y intégrer efficacement l'outil informatique ;
4. Formation à développer des outils et développer des outils pour se former.

Mise en oeuvre :

La formation s'est organisée en deux phases :

1. Une formation technique aux notions de base de l'informatique et aux logiciels d'application, échelonnée sur dix séances, d'une journée chacune ;
2. Deux journées consacrées à une réflexion sur les utilisations des progiciels, comme outils d'enseignement et d'apprentissage. Dans ce cadre, les chercheurs de l'université ont proposé une série de "détournements" pédagogiques des logiciels d'application. Des groupes d'enseignants ont ensuite développé des projets d'intégration de l'outil informatique dans l'enseignement des sciences.

Produits :

Un groupe de quatorze enseignants de sciences de diverses écoles des provinces de Hainaut et Brabant, a béneficié de cette formation.

Cinq logiciels ont été élaborés, trois à partir de LOTUS et deux à partir de DBASE III+. Rapport final publié en mai 1989.

FACULTES UNIVERSITAIRES NOTRE-DAME DE LA PAIX
DEPARTEMENT EDUCATION ET TECHNOLOGIE

Titre du projet :	**FORMATION CONTINUE D'INSTITUTEURS SUR LEUR LIEU DE TRAVAIL**
Personne à contacter :	Professeur Jean Donnay Département Education et Technologie, FUNDP 61, rue de Bruxelles, B - 5000 Namur, Belgique Tél. 081/72 50 65
Durée :	Octobre 1990 à septembre 1992
Financement :	– Facultés Universitaires Notre-Dame de la Paix, Namur – Ministère de la Formation de la Communauté française
Universités associées :	Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans six écoles primaires, le projet vise la formation continue autonome d'instituteurs sur leur lieu de travail. Il se propose de :

- Concevoir et diffuser un environnement d'apprentissage intégrant plusieurs médias, destiné à l'enseignement fondamental de la Communauté Française de Belgique ;
- Former un groupe d'instituteurs à concevoir, gérer et évaluer un environnement d'enseignement et d'apprentissage intégrant différent médias, en exploitant le concept d'EPIDO (Ensemble multimédia favorisant l'intégration de l'ordinateur dans l'enseignement) développé par APO Québec ;
- Analyser et évaluer la procédure de formation mise en oeuvre afin d'aider à définir des politiques en formation continue, en particulier sur le lieu de travail ;
- Créer avec les enseignants des outils d'analyse de leurs pratiques.

Mise en oeuvre :

La démarche de formation est centrée sur deux axes : a) se former à développer des outils (i.e. maîtriser les connaissances techniques pour concevoir de petites applications et imaginer des contextes d'utilisation possibles) et, b) développer des outils pour se former (i.e. profiter des précisions exigées par tout travail de conception mettant en oeuvre les NTI, pour développer des capacités d'analyse et d'amélioration de sa propre pratique). L'évaluation des outils pédagogiques se fera par un aller-retour systématique entre conception et expérimentation en classe, tout en incluant la participation d'observateurs extérieurs (chercheurs et instituteurs).

Produits :

- Un ensemble multimedia sera réalisé incluant un guide pédagogique destiné à l'enseignant et un guide de l'élève.
- Un recueil systématique de données portant sur les représentations des intervenants vis-à-vis de l'intégration des NTI sera réalisé tout au long de la formation. Une évaluation finale (octobre 1992) sera l'occasion d'analyser l'ensemble du processus de formation mis en oeuvre. Cette synthèse pourra concourir à la mise au point d'une politique de formation continue centrée sur l'apprentissage sur le lieu de travail (on the job learning).

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UNIVERSITY OF CALGARY
UNIVERSITY OF ALBERTA

Title of project:
1. DISTANCE LEARNING IN SMALL SCHOOLS PROJECT
2. DISTANCE LEARNING PROJECT NORTH

Person to contact:
Prof. W. Bruce Clark
Department of Curriculum and Instruction
University of Calgary
702 Education Tower
2500 University Drive NW
Calgary, Alberta, Canada T2N 1N4

Duration: From March 1988 to January 1990

Funding:
- Alberta Education
- Schools juridictions

Associated Universities: University of Alberta

BRIEF DESCRIPTION OF THE PROJECT

Aims:

1. Distance learning in small Schools Project. In 28 upper secondary schools in the southeast quadrant of the Province of Alberta (co-ordinated through a distance education office): to increase the course offerings in very small high schools (11-75 students usually).
2. Distance learning Project North. In 26 upper secondary schools in the northern part of the Province of Alberta (co-ordinated through the Alberta Correspondence School): to widen the mathematics curriculum.

Implementation:

Project 1. Independent study by the students using materials from the correspondence school. These were supported by a network of tutor-markers who were linked to the schools by FAX and telephone. Some teleconferencing (audio) also took place.

Project 2. Primarily mathematics, though in some schools subjects included German, physics and accounting. The project used computer managed learning as a means of offering a wider variety of mathematics courses than could be offered in the traditional classroom fashion. Some schools also shared teacher resources through teleconferencing.

Evaluation (the principal role of the University) focused on management issues. However, pedagogical issues emerged as being more serious, i.e. the technologies employed both enable and constrain; where only independent study is offered, goals which could not be met through independent study are not addressed; other goals are either ignored or reshaped to match the capabilities of technology. These issues are expected to spawn a new series of project.

Products:

Final report May 1990.

UNIVERSITE CONCORDIA

Titre du projet: L'APPRENTISSAGE DE L'ELECTRONIQUE INDUSTRIELLE PAR UN LABORATOIRE DE SIMULATION

Personne à contacter: Professeur Geza Joos
Professeur Gary M. Boyd
Département de Génie électrique et informatique
Département de l'Education
Université Concordia
1455, boul. de Maisonneuve Ouest
Montréal, Québec, Canada H3G 1M8

Durée: De janvier 1989 à décembre 1993

Financement: Ministère de l'Enseignement supérieur de la Science du Gouvernement du Québec

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Dans trois collèges d'enseignement technique professionnel de Montréal :

- Fournir aux enseignants et aux élèves des outils nouveaux et mieux adaptés au transfert des connaissances et des méthodes de travail les plus récentes en electronique industrielle.

Mise en oeuvre:

Un nouveau concept d'apprentissage de la pratique est proposé: celui d'un laboratoire basé sur des logiciels de simulation et employant la micro-informatique. Des théories d'apprentisage appropriées à l'enseignement de l'électronique industrielle seront combinées avec des méthodes de formation [illegible]s sur ordinateur pour développer ce laboratoire de simulation.

Le projet est du type recherche-développement puisqu'il a pour but de développer du matériel didactique pour l'apprentissage des connaissances pratiques et les aspects de manipulations sur les équipements. Il est aussi de nature recherche-action car il comprend l'expérimentation et l'adaptation de differents modèles de formation.

L'équipe est pluridisciplinaire et compte un psycho-pédagogue, deux professeurs des deux disciplines, des enseignants du milieu collégial et des représentants de l'industrie.

Produits:

Le but visé est le remplacement d'un certain nombre de manipulations aujourd'hui effectuées dans les laboratoires traditionnels.

Rapport final en décembre 1993

UNIVERSITE LAURENTIENNE
ECOLE DES SCIENCES DE L'ÉDUCATION

Titre du projet : PROJET DE MISE EN OEUVRE DES "ECOLES-PHARES"

Personne à contacter : Professeur Jean Séguin
Ecoles des Sciences de l'Education
Université Laurentienne
Chemin du Lac Ramsey
Sudbury, Ontario, Canada P3E 2C6

Durée : De juin 1987 à décembre 1988

Financement :
- Ministère de l'Education de l'Ontario: $170 000
- Conseil des écoles catholiques de Sudbury
- Université Laurentienne

Universités associées : None

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans les écoles primaires et secondaires, ainsi que dans les écoles francophones :

a. Démontrer et documenter comment les didacticiels sont utilisés dans la salle de classe;

b. Aviser le Ministère des stratégies de mise en oeuvre des projets "Ecoles-phares";

c. Examiner comment les didacticiels appuient les objectifs de programme tels qu'énoncés par le Ministère et le Conseil scolaire et comment ces didacticiels aident à renforcer le rendement des élèves.

Mise en oeuvre :

a. Plusieurs projets d'innovations portant sur les applications pédagogiques des ordinateurs furent élaborés, réalisés et évalués dans trois écoles de langue française. Ces projets novateurs répondaient aux besoins prioritaires d'apprentissage des élèves tout en exploitant les didacticiels de langue française les plus prometteurs.

b. Une analyse a été éffectuée des perceptions des experiences vécues par les personnes engagées aux divers paliers de la mise en oeuvre des innovations. Le degré de réussite de chaque application pédagogique des ordinateurs a été analysé. Des recommendations au Ministère de l'éducation concernant les différentes stratégies de mise en oeuvre ont été proposées.

c. Une appréciation critique a été entreprise des activités et des réalisations en ce qui concerne l'utilisation des differents didacticiels.

Produits :

Création de guides pédagogiques pour accompagner les meilleurs logiciels utilisables en langue française. Formation des enseignants et apport d'un soutien approprié afin qu'ils puissent intégrer certains de ces logiciels/didacticiels dans leur salle de classe.

Rapport en février 1989.

UNIVERSITE D'OTTAWA
FACULTÉ D'ÉDUCATION

Titre du projet : ETUDE DE L'INCIDENCE DES NOUVELLES TECHNOLOGIES EN EDUCATION

Personne à contacter : Professeur Pierre Michaud
Université d'Ottawa
651, rue Cumberland
Ottawa, Ontario K1N 6N5, Canada
Tel. (613) 564-4296

Durée : De septembre 1987 à septembre 1990

Financement :
- Ministère de l'Education de l'Ontario
- Conseil scolaire de langue française d'Ottawa-Carleton

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectif :

Etudier l'influence de la technologie sur les apprentissages, les enseignements et la gestion pédagogique dans des classes d'élèves du premier cycle du secondaire.

Mise en oeuvre :

Il s'agit d'une étude longitudinale de trois ans concernant la même cohorte d'élèves (au départ âgés de 12/13 ans), qui ont passé les deux premières années du projet correspondant à la fin de leur scolarité dans une école et la troisième dans une autre de niveau supérieur. Les enseignants ont bénéficié constamment d'un support pédagogique et technique. Ils disposaient du matériel informatique approuvé par le ministère de l'Education de l'Ontario.

Produit :

Le rapport final de ce projet sera disponible au début de l'année 1991.

UNIVERSITY OF TORONTO
COMPUTER SYSTEMS RESEARCH INSTITUTE

Title of project: MULTIMEDIA HYPERMEDIUM IN THE CLASSROOM

Person to contact: Dr. Martin Lamb
Research Associate
University of Toronto
Computer Systems Research Institute
Toronto, Ontario M5S 1A1, Canada

Duration: From May 1990

Funding: Toronto Board of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To observe teacher-student interaction when using *Menulay* in order to understand what supplementary materials are required to best use it in the Ontario curriculum (*Menulay* is a software utility which allows the individual to create full-colour, interactive programs featuring text, pictures, animation, music, speech and sound effects without writing a single line of programming code).

To develop resource materials for teachers to introduce them to Menulay.

To hold 20 hands-on workshops which will show teachers how to use Menulay in the classroom and how to integrate it with the Ontario curriculum.

Implementation:

A secondary public school was chosen to test *Menulay*. The teacher in charge and selected students provided formative evaluation to the university researchers in order to reshape the product. As a result of observations of teacher-student interaction with *Menulay*, it was determined that teachers in the Toronto Board, and elsewhere in Ontario, would require four types of implementation assistance: a floppy disk that would contain examples demonstrating special features, a videotape that would demonstrate classroom examples, a teacher's guide that would suggest a number of possible cross-curricular applications and a series of workshops to assist teachers with a hands-on introduction to *Menulay*.

Products:

Using ICONs computers connected to videodisks and interactive videos has allowed students to explore the world of multi-media - linking text with still photos, with moving pictures, with music. Furthermore, considerable progress has been made towards the goal of the four implementation products.

UNIVERSITY OF TORONTO
TECHNOLOGY FOR ENHANCING LEARNING CENTRE (TEL)

Title of project: DURHAM TEL PROJECT

Person to contact: Prof. Robert D. Cook
Head, TEL Centre, Faculty of Education
University of Toronto (FEUT), 371 Bloor Street W.
Toronto, Ontario M5S 2R7, Canada
Tel: 415.978.7880 - Fax: 416.978.5775

Duration: From September 1989 to June 1992

Funding: Centre for Curriculum Resources & Technologies

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

This is a specific project of the TEL Centre, which is part of the Faculty of Education. The ultimate goal is to serve learners in Ontario Schools through effective teacher education. More specifically, the TEL Centre's mission is to enhance teacher education by achieving the appropriate use of new technology in all areas of FEUT activity. This includes several components: involvement with teacher education programs and faculty to assist new and practicing teachers to use television, computers and other electronic technologies: supporting the administrative use of technology, supporting academic and administrative staff in learning to use technology to increase their professional productivity: supporting faculty research, including investigation of how technology can be used to improve learning. The Centre's goals are accomplished through both ongoing services and specific projects.

Aims:

In seven schools, in lower and upper secondary education, in cross-curricula subjects, plus English and French language, drama and science:

- To implement and evaluate a model of teacher education which will permit teachers at all stages of their professional education to integrate technological teaching and learning tools into their curricula.

Implementation

The project uses collaboratiuve and peer coaching strategies. In the first year, teachers learned a range of innovative uses of computer, video and other technologies. They then developed and delivered substantial curriculum-based projects in each of their schools. Both process and outcomes were monitored by an external evaluator.

In the second and third years, each experienced group will coach a new team in another school, thus expanding the total number of schools affected. Student teachers will carry their skills back to other developing teachers and, upon graduation, to even more schools as they assume their appointments in other school jurisdictions.

A project advisory committe meets four times a year to review progress and suggest new directions.

Products:

Reports annually in September. Final report September 1992.

UNIVERSITY OF TORONTO
TECHNOLOGY FOR ENHANCING LEARNING CENTRE (TEL)

Title of project: IMPACT OF TECHNOLOGY ON LEARNING MATHEMATICS IN THE TRANSITION YEARS

Person to contact: Prof. Robert D. Cook
Head, TEL Centre, Faculty of Education
University of Toronto (FEUT), 371 Bloor Street W.
Toronto, Ontario M5S 2R7, Canada
Tel: 415.978.7880 - Fax: 416.978.5775

Duration: From September 1990 to June 1994

Funding:
- Centre for Curriculum Resources & Technologies
- Apple Canada and other vendors

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

This is a specific project of the TEL Centre (see previous page)

Aims:

In two schools, one designed and built anticipating high technology use, the other in transition from traditional educational methods to integration of modern technologies:

- To consider the effectiveness of computer and television technology in the teaching and learning of mathematics.

Implementation:

Approximately fifty students in each of two schools were involved, using high technology in teaching and learning. A third population of students drawn from schools using traditional methodologies will receive instruction in six mathematics topics using a range of technology-based materials and strategies. Student learning will be compared at the end of each school year.

The TEL Centre will support the project by recommending appropriate resources and utilisation strategies, and by planning and delivering teacher development activities in collaboration with the teachers, school principals and Board personnel.

A project advisory committee meets about four times a year to review progress and suggest new directions.

Products:

One of the most eagerly anticipated outcomes from the four-year project will be suggestions for a technology-based mathematics curriculum for the transition years from traditional methods to integration of modern technologies.

Reports annually in September. Final report September 1994.

YORK UNIVERSITY
CENTRE FOR THE STUDY OF COMPUTERS IN EDUCATION

Title of project: THE IMPACT OF COMPUTERS ON STUDENT WRITING

Person to contact: Dr. Ronald Owston
York University
Faculty of Education
4700 Keele Street, North York, Ontario
Canada, M3J 1P3

Tel: (416) 736-5019

Duration: From 1988

Funding:
- York University, Faculty of Education Research Fund
- Apple Canada Education Foundation

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To investigate the benefits of the computer as a writing tool, by comparing the work of one hundred and eleven experienced eighth grade students (lower secondary education), in four communications arts classes, working both on and off computers.

Implementation:

Pupils had been using computers for the writing component of their classes for a year and a half with four 40 minute periods in a six day cycle in a computer room (one Apple IIGS for each student). By the time the study began, they had made the transition from revising drafts by hand and then copying them into the computer, to composing and editing directly on the computer.

Products:

A technical report, in May 1990: "On and Off Computer Writing of Eighth Grade Students Experienced in Word Processing", concludes that the computer written work was significantly better in overall quality and on the competency and mechanics subscales of the Scale for the Evaluation of Narrative Writing (R.D. Owston, S. Murphy & H.H. Wideman).

A follow-up three-year study (1990-1993), financed by the Ontario Ministry of Education, was therefore started in two schools (primary and lower secondary education). It aims at contributing to the formulation of school board policy in the use of word processing in the language arts curriculum.

Denmark

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JELLING TEACHER TRAINING COLLEGE

Title of project: EXPERIMENTS IN THE USE OF TELECOMMUNICATION AS A TEACHING METHOD IN TEACHER TRAINING

Person to contact:
Mr. Per Pjengaard
Jelling Teacher Training College
Vejlevej 2
7300 Jelling, Denmark
Tel. 75 87 16 00

Duration: From March 1986 to February 1989

Funding:
- Widedand communication
- Vejle municipality
- The Royal Danish School of Educational Studies
- The Danish Ministry of Education
- The Jutland Telephone Company

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To experiment with telecommunication (two way sound and picture communication) as a teaching method in teacher training. Two schools at primary and lower secondary level of education have been selected for the experiment.

Implementation:

The video equipment enables Jelling Teacher Training College to follow the teaching of the student teacher, practice teacher and teachers from the training college.

Three types of videoconferences have been used:

Type 1. Direct broadcast of a lesson from the school classroom to Jelling College where one or two researchers follow the teaching.

Type 2. Videoconference, discussion of a lesson on tape.

Type 3. Videoconference of several taped lessons. Different situations and themes are discussed; for instance, how are groups formed in the class?

Products:

In terms of improving teacher training, these experiments of videoconferences have shown that a closer connection has been established between the theoretical part of the training at the Jelling College and the practical part at the schools.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
INSTITUTE OF INFORMATICS

Title of project:	**THE CRITIQUING PROJECT - APPLYING SECOND GENERATION EXPERT SYSTEMS IN EDUCATION**
Person to contact:	Prof. Bent B. Andersen Royal Danish School of Educational Studies Emdrupvej 115B DK-2400 Copenhagen NV, Denmark Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81
Duration:	From August 1988 to July 1991
Funding:	– Institute of Informatics – Local School authorities
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In twenty schools, primary and lower secondary, in social science, biology, Danish mother-tongue and informatics:

– To investigate the use of critiquing systems in education.

Implementation:

Critiquing systems are second generation expert systems used to criticise student's problem solving abilities by showing them their mistakes and offering suggestions, improvements and alternatives. The research strategy is to implement prototype critiquing systems and to study their pedagogical uses. Students play an active role in proposing solutions to problems. The system provides feedback for them to evaluate and redefine solutions. Students thereby become responsible for their own learning.

Some teachers are instructed as part of in-service teacher training courses. Others are instructed at meetings in their school district.

The teachers and the researcher meet regularly. The researcher participates to some extent in classroom activities.

New schools will join the project in the future.

Products:

A report on the work so far is given in: Bent B. Andersen "Applying Second Generation Expert Systems in Education - The Critiquing Approach". In *Computers in Education:* A. McDougall and C. Dowling (Editors). Elsevier Science Publishers B.V. (North Holland), 1990.

Reports on the project will be sent to education policy-makers.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
THE GEOGRAPHICAL INSTITUTE

Title of project: INTEGRATION OF ELECTRONIC DATA PROCESSING IN SCHOOL SUBJECTS

Person to contact: Tonny Hübe
Danmarks Laererhojskole
Emdrupvej 101
DK-2400 Copenhagen NV, Denmark
Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81

Duration: From August 1989 to July 1990

Funding:
- The Primary School Development Board
- The Experimental Department of the Copenhagen Municipal Educational Board

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In a Danish and a German lower secondary school:

To show the ways in which the use of the information technology can contribute to:

- Increased insight into social conditions at home and abroad;
- Strengthening interest for and skill in the use of foreign languages (in this case, German);
- Increased international understanding.

Implementation:

Education work in the German and Danish schools took place simultaneously.

Professional computer application programs were used as tools in co-operation with traditional teaching tools. Data base and archives are used as sources on-line with traditional sources.

The researcher acted as adviser for both schools, established a framework for mutual educational progress, and prepared the bulk of the educational materials. A meeting of teachers from both countries was held. An interdisciplinary project group for evaluation of the school projects in integration of electronic data processing was established.

Products:

Final report December 1990.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
DEPARTMENT OF FOREIGN LANGUAGES

Title of project: **THE USE OF WORD PROCESSING IN ENGLISH COMPOSITION BY INTERMEDIATE STUDENTS - A CONTRIBUTION TO DESCRIPTION AND ANALYSIS OF THE WRITING PROCESS**

Person to contact: Prof. Erik Poulsen
Royal Danish School of Educational Studies
Emdrupvej 101
DK 2400 Copenhagen NV, Denmark
Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81

Duration: From April 1986 to June 1991

Funding: – Department of Foreign Languages, plus a grant of DK.22 000 to each of the lower secondary schools

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In foreign language teaching (English and German) in five schools, lower secondary:

- To describe and analyse word processing integrated into the students' writing of school compositions using a process-oriented approach. More specifically, the study concentrates on three aspects:
  1. A description and analysis of the writing process;
  2. An analysis of what constitutes important instructional, organisational and administrative conditions when integrating word processing into teaching;
  3. An evaluation of the usefulness of a "spelling checker".

Implementation:

The project has been divided into three main phases: a pilot project (1986/87) involving two teachers and forty-eight students, a main phase (1987/88 and 1988/89) involving three teachers and sixty-five students and an implementation phase (1989/90 and 1990/91). The last phase is a follow-up, planned as developmental work in English and German, involving ten teachers of English and five of German and one hundred and seventy-eight students. Regular meetings were held with the National Innovative Centre for General Education. Limited participating observation was carried out by the researcher.

A two-year study group was organised at the University.

Products:

Reports to be sent to educational policy-making bodies.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
INSTITUTE OF INFORMATICS

Title of project: COMPUTERS IN PRIMARY SCHOOL

Person to contact: Prof. Leif Gredsted
Royal Danish School of Educational Studies
Emdrupvej 115B
DK-2400 Copenhagen NV, Denmark
Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81

Duration: From January 1989 to December 1991

Funding:
- Institute of Informatics
- Local school authorities

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two schools, pre-primary and primary:

- To investigate the use of computers as a pedagogical tool.
- To describe types of computer programs suited to supporting interdisciplinary teaching in the first grades, and how these programs should be designed to correspond to the level of development of the children.
- To investigate the ability of children aged 6-8 to learn and use application programs that are fundamentally different from computer games.

Implementation:

Design, implementation and observation of classroom use of computer programs is an essential part of the project. The programs are designed to support the childrens' usual working methods and the topics normally taught at this level.

The first period of classroom observation took place in autumn 1990. The intention was to observe the childrens' work with the first specially designed computer program, which is a drawing and writing program, permitting them to make "drawing stories" or cartoons.

Products:

Reports containing accounts of teachers' experiences, lesson plans and teaching materials, for use in in-service teacher training.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
INFORMATICS IN SCHOOL SUBJECTS

Title of project: INFA: SCHOOLS IN NETWORK

Person to contact: Prof. Allan C. Malmberg
Royal Danish School of Education
Emdrupvej 115B
2400 Copenhagen NV, Denmark
Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81

Duration: Ongoing since August 1989

Funding: Financed nationally

Associated Universities:
- Manchester Polytechnic, United Kingdom
- City University of New York, United States
- University of Amsterdam, The Netherlands

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In fifty schools, primary to upper secondary, in a number of countries (Denmark, Canada, Germany, Iceland, Netherlands, Spain, United Kingdom, United States):

- To study the pedagogical prospects for the use of telematics (E-mail) in education;
- To illustrate the extent to which this simple distant education system is effective.

Implementation:

The area of interest is not the use of databases, but communication between persons or groups of persons, including communication across frontiers. Participants need an ordinary PC. They communicate through the Overseas Academic Research Network (EARN). The project developed a number of user facilities that make distance education as simple as possible to teachers as well as students. A userfriendly system was devised by means of menus and specially designed message systems. In practical terms, co-operation is organised by means of a network of co-ordinators at regional universities and teaching and public institutions in Europe, the United States and Canada.

The project has been used in a continuing education course in mathematics for teachers. The course content was topics within statistics and probability, and the material was organised in twenty lectures (120 hours of work). Various communication projects for students have been developed, among them: communicatrion with Iceland and England, communication with handicapped students, and communication in American culture and mathematics.

New schools are continually joining the project.

Products:

The results of the research in using E-mail in the teaching of language will no doubt have an effect on the revision of the curriculum for integrating IT in the teaching of foreign languages.

ROYAL DANISH SCHOOL OF EDUCATIONAL STUDIES
DEPARTMENT OF DANISH LANGUAGE AND LITERATURE

Title of project:	**PRODATA: WORD PROCESSING AND THE WRITING PROCESS IN THE FIRST STAGES OF PRIMARY SCHOOL**
Person to contact:	Prof. Elisabeth Hansen Royal Danish School of Educational Studies 101 Emdrupvej DK - 2400 Copenhagen NV, Denmark Tel: +45 31 69 66 33 - Fax: +45 39 66 00 81
Duration:	From August 1988 to June 1990 (possibly 1992)
Funding:	The Ministry of Education.
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two primary schools:

- To learn by experience, using word processing, how process-oriented writing can be used in language teaching in Danish mother-tongue;
- To monitor pupils becoming users of word processing.
- To facilitate acquisition by teachers of skills in the use of computers.

Implementation:

Each school class has access to four computers with a simple professional word processing program, in all lessons. The development in their text writing, as well as their reading skills, spelling skills and handwriting is monitored.

Methods and tests were imparted by the researcher, while the pratical pedagogical elaboration was accommodated within the teachers' whole classroom teaching. The researchers observed and participated in the classroom teaching approximately once a week.

A questionnaire distributed to parents, asking for their opinions and attitudes, showed very wide support from them, both for the pedagogical methods and use of word processing in the first stages of elementary school.

Products:

A realisation of the possibility and necessity for a renewal of methods and tools in teaching writing and reading at the early stages in basic education.

Finland

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UNIVERSITY OF HELSINKI
DEPARTMENT OF EDUCATION

Title of project:	**MICROCOMPUTER - A TOOL FOR INSTRUCTIONAL DEVELOPMENT**
Person to contact:	Prof. Leino Jarkko University of Helsinki SF-00120 Helsinki, Finland
Duration:	From January 1986 to May 1991
Funding:	– Local education authorities – SITRA – National School Board
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary, lower and upper secondary education:

- To develop, with the aid of the computer, a means of instruction which will emphasize active learning and student-centred and project-oriented studies.

Implementation:

The focus of the project was on making subject matter more interesting and relevant to pupils, and on evolving a more co-operative role for the teacher, i.e. as planner and supporter, rather than information-presenter.

The method used was action-research. Teachers worked together in small groups to develop and evaluate projects in their subjects, for use with computers in their classrooms. They also planned the in-service education they needed to carry out these plans. In this way, teachers' in-service education has been implemented throughout the duration of the project. A new computerised assessment system was devised in which students basic skills (reading, writing, etc.) and general behaviour are assessed.

The researcher organised general lectures about the project and wrote the annual reports.

Products:

Annual reports. Final report September 1991.

UNIVERSITY OF JYVASKYLA
INSTITUTE FOR EDUCATIONAL RESEARCH

Title of project: THE COMPUTER AS TOOL IN SCHOOL WORK

Person to contact: Prof. Raimo Konttinen
University of Jyväskylä
Seminaarinkatu 15,
SF-40100 Jyväskylä, Finland
Tel: +358 41 603231 – Fax: +358 41 603201

Duration: From 1986 to 1987

Funding:
- SITRA, Finnish Independence Jubileum Fond
- City of Kauniainen
- Institute for Educational Research

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

- To study instructional uses of tool programmes, i.e word processing, database management, spreadsheet, drawing, music composition and telecommunications and their integration by teachers in primary and secondary school work.
- To achieve pupil literacy in information technology by using these tools.

Implementation:

Four studies were undertaken:

Study I: *Uses of computer as tools in school work.* Some 300 pupils and 30 teachers of secondary education were involved.

Study II: *An integrated approach to computer literacy instruction in comprehensive schools* . Two schools, six classes and three teachers participated in the study.

Study III: *Computer literacy of teachers.* An experiment to find out how teachers having little previous experience in computers learn to integrate the use of tool programmes with the rest of their instruction.

Study IV: *Project studies in teacher training.* A "Project study model" was developed to design and investigate a teacher training programme that would combine instruction in the didactics and educational use of computers to the teachers' own subject areas. This is based upon the experiences of the previous studies and on action and

Products:

The Finnish National Board of Schools has adopted the Project study model and implemented it in several "Developmental Schools".

UNIVERSITY OF LAPLAND
DEPARTMENT OF EDUCATION

Title of project:	**TUKU PROJECT: COMPUTERS, A NEW DIMENSION IN EDUCATION**
Person to contact:	Prof. Kurtakko Kyösti University of Lapland Department of Education Post Box 122 96101 Rovaniemi, Finland Tel. 358 60 324414 – Fax: 358 60 324207
Duration:	From August 1987 to December 1989
Funding:	Regional Government of Lapland
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four primary and two upper secondary schools located in rural districts of Lapland (50 teachers and about 600 pupils):

- To develop in the schools practices which make use of computers as aids in teaching and study;
- To change the method of instruction by strengthening and increasing experiential and practical learning and enhancing the role of the pupils in choosing the subjects and themes studied;
- To encourage schools to develop new methods of working, particularly groupwork.

Implementation:

The project is being carried out as pedagogical-analytical action research. The schools engage in "product development", which in turn contributes to teacher competence and student readiness to function under constantly-changing circumstances. The teachers and pupils work together on some subject or theme, making use of computers where these are pertinent tools. Students and teachers together draw lessons from these experiences (conceptual control of reality, professional and community skills) and new themes for study are thought up and worked out.

Meetings are held two or three times a year with teachers, regional and local authorities and the researcher.

Products:

Final reports (Reports B.13 and B.14 of Lapland University) in 1990.

France

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CONSERVATOIRE NATIONAL DES ARTS ET METIERS
CENTRE DE RECHERCHES ET D'EXPERIMENTATION POUR L'ENSEIGNEMENT DES MATHEMATIQUES

Titre du projet: MATHEMATIQUES AVEC IMAGES LOGICIELLES

Personne à contacter: Professeur Jérome Chastenet de Géry
CREEM
292 rue Saint Martin
F 75141 Paris cedex 03, France

Durée: De 1986 à 1991

Financement:
- Conservatoire National des Arts et Métiers (CNAM)
- Ministère de l'Education nationale

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Dans sept lycées (secondaire supérieur) et quelques autres établissements :

- Etudier et réaliser un ensemble de logiciels destinés à illustrer par Images Logicielles interactives ("Imagiciels") la totalité du programme de mathématiques d'une année de cours de l'enseignement secondaire supérieur.

Mise en oeuvre:

L'année de cours choisie a été la classe de seconde (élèves de 15-16 ans), en raison de son rôle charnière : première classe de l'enseignement secondaire supérieur et dernière classe non spécialisée. Les logiciels ne sont pas utilisés en mode tutoriel individuel, mais en mode collectif par le professeur, dans sa classe, dialoguant avec son micro-ordinateur et ses élèves qui suivent les images de façon interactive sur les écrans vidéo de la salle.

La coopération entre le CNAM et les écoles s'est manifestée aux niveaux de la conception, de la réalisation, de l'expérimentation et de la réflexion didactique.

Produits:

Un Manuel de mathématiques pour la classe de seconde, illustré par Images Logicielles. Une brochure destinée à l'information et à la formation des enseignants qui sera diffusée par le Centre National de Documentation Pédagogique.

Rapport final attendu pour 1991

INSTITUT UNIVERSITAIRE DE TECHONOLOGIE
UNIVERSITE D'AIX-MARSEILLE II

Titre du projet: L'ORDINATEUR VECTEUR D'ENTRAINEMENT À LA LECTURE (LOVELY)

Personne à contacter: Daniel Feneuille
Maître de Conférence
Département Informatique
I.U.T d'Aix en Provence
Avenue Gaston Berger
13625 Aix en Provence Cedex 01, France

Durée: De novembre 1988 à octobre 1990 (ou 1991)

Financement:
- Direction des Ecoles du Ministère de l'Education Nationale
- Département Informatique de l'I.U.T.
- Municipalités d'Aubagne et de Salon de Provence

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Valider des logiciels d'entrainement à la lecture pour les enfants de l'enseignement pré-primaire, primaire et primaire spécialisé (cycle II des apprentissages de base - âge 5-8 ans) dans six écoles.

Mise en oeuvre:

Ces logiciels ont été établis avec la collaboration d'enseignants du primaire et de spécialistes en sciences cognitives et en sciences de l'éducation. Ils se situent au-delà des querelles de méthodes d'enseignement et ont pour vocation de mettre le plus tôt possible l'apprenti lecteur dans des situations de lecture où il s'obligera à développer des lectures d'adultes (i.e. sans oralisation).

Produits:

Une quarantaine de logiciels opérationnels sur ordinateurs, type PC compatibles, ont été conçus, certains utilisant une synthèse vocale ou un videodisque. Les disquettes sont régulièrement actualisées.

Un Bulletin de liaison transmet les informations entre les écoles et l'université.

UNIVERSITE DU MAINE
LABORATOIRE INFORMATIQUE

Titre du projet : **RECHERCHES SUR L'USAGE DES TECHNOLOGIES EDUCATIVES**

Personne à contacter : Professeur Martial Vivet
Université du Maine
Faculté des Sciences
BP 535
F72017 Le Mans cedex, France
Tel: (33) 43 83 32 11 – Fax: (33) 43 83 33 66

Durée : Sur une base continue

Financement :
- Région des Pays de Loire
- Ministère de l'Education Nationale
- Centre National de la Recherche Scientifique

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectif :

Au niveau des collèges (secondaire inférieur) et d'un lycée technique, étudier l'apport des technologies nouvelles à l'éducation et à la formation.

Mise en oeuvre :

Le domaine d'enseignement choisi est la technologie : *électronique et mécanique* pour les collèges et *productique* pour les lycées. Pour les premiers, l'accent est mis sur le développement de la "micro-robotique pédagogique". Les enseignants jouent le rôle de conseillers sur le contenu pédagogique et les chercheurs se centrent sur les réalisations matérielles et logicielles.

Produits :

Liés à la micro-robotique comme environnement d'apprentissage et à l'intelligence artificielle, e.g interface homme/machine en langue naturelle.

UNIVERSITE DE NANCY 1
CENTRE DE RECHERCHE EN INFORMATIQUE DE NANCY

Titre du projet : **UTILISATIONS PERTINENTES DE L'INFORMATIQUE DANS LES PRATIQUES PEDAGOGIQUES**

Personne à contacter : Professeur Monique Grandbastien
Université de Nancy 1
Campus Scientifique
BP 239
54506 Vandoeuvre Cedex, France
Tél. (33) 83 91 21 23

Durée : Octobre 1986 à 1989

Financement : Education Nationale

Universités associées : Université de Nancy 2

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans des écoles secondaires :

- Dans une première phase, identifier dans chaque discipline des situations d'utilisation de l'informatique particulièrement pertinentes ; définir, expérimenter, éventuellement modifier et diffuser les séquences pédagogiques correspondantes ;
- Dans une seconde phase (en cours), identifier des situations pertinentes d'utilisations de l'ordinateur en autonomie.

Mise en oeuvre :

Le projet est une fédération de "recherche-actions", toutes conduites par des enseignants du second degré et pilotées par un professeur d'université, spécialiste des applications pédagogiques de l'informatique. Les séquences pédagogiques produites sont expérimentées dans les différents établissements du second degré (secondaire inférieur, supérieur et technique).

Produits :

Contenus de stages de formation continue d'enseignants et 8 fascicules d'une collection créée à cet effet ("Fenêtre Active", Centre Régional de Documentation Pédagogique de Nancy).

UNIVERSITE DE NANCY 1
CENTRE DE RECHERCHE EN INFORMATIQUE DE NANCY

Titre du projet : **INTELLIGENCE ARTIFICIELLE ET ENSEIGNEMENT DE LA CHIMIE QUANTITATIVE**

Personne à contacter : Professeur Monique Grandbastien
Université de Nancy 1
Campus Scientifique BP 239
54506 Vandoeuvre Cedex, France
Tél. (33) 83 91 21 23

Durée : En cours depuis 1989

Financement :
- Centre National pour la Recherche Scientifique
- Institut National pour la Recherche Pédagogique

Universités associées : Néant.

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans un lycée secondaire/supérieur (élèves de 16-17 ans) :

- Analyser l'aide que des représentations graphiques de certains concepts en chimie quantitative peuvent apporter à l'environnement qu'utilise les enseignants, c.à.d. actuellement, l'environnement textuel.

Mise en oeuvre :

Il s'agit de fournir un générateur d'objets graphiques de façon à ce que les schémas affichés soient construits en fonction du problème posé et non pas issus d'une bibliothèque figée.

Les enseignants spécifient leurs besoins, les chercheurs de l'université proposent une maquette répondant à ces besoins. Cette maquette devrait être ensuite intégrée (à condition qu'ils aient des stations de travail le permettant) au logiciel des professeurs de chimie et expérimentée dans leurs classes.

Produits :

Logiciel système tuteur intelligent.

UNIVERSITE DE NANTES
CENTRE DE RECHERCHE EN EDUCATION

Titre du projet : UTILISATION DES NOUVELLES TECHNOLOGIES EN INFORMATION ET FORMATION

Personne à contacter :
Professeur Luc Guen
Université de Nantes
Centre de Recherche en Education, Section Informatique
Chemin de la Sensive du Tertre, B.P. 1025
44036 Nantes cedex 01, France

Tél. (40) 74 01 11 – Fax (40) 37 92 33

Durée : De septembre 1988 à septembre 1990

Financement :
- *Matériel* par la Chambre de Commerce et d'Industrie de Nantes
- *Logiciel* par la Mission Académique à la Formation des Personnels de l'Education Nationale (MAFPEN)

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Utiliser une banque de données documentaire dans un lycée (secondaire supérieur technique) comme outil pédagogique au service de la formation générale et de la formation professionnelle des élèves du secteur tertiaire.

Mise en oeuvre :

La base de données "Vialdoc" a été constituée sur un mini-ordinateur du lycée. Des périphériques (minitels et terminaux) répartis dans le lycée et dans divers organismes (autres lycées et Centre de documentation de la Chambre de Commerce) y sont connectés. Les élèves ont la possibilité de réaliser des travaux réels en entrant dans la banque de données des informations récentes et diversifiées sous la forme de résumés et de descripteurs afin de guider les recherches bibliographiques des utilisateurs de cette banque.

Produits :

Ce travail oblige les élèves, sans contrainte excessive, à lire des documents dans les disciplines correspondant à leur formation et à en faire la synthèse qui nécessite précision des termes et concision. Il leur permet également d'acquérir une bonne formation, sur le terrain, à la télématique.

Un rapport final sera disponible mi-1991.

UNIVERSITE DE PARIS-NORD
DEPARTEMENT DES SCIENCES DE L'EDUCATION

Titre du projet : **UTILISATION DES NOUVELLES TECHNOLOGIES DANS L'APPRENTISSAGE DE LA LANGUE ECRITE CHEZ LES JEUNES ENFANTS**

Personne à contacter : Dr. Rachel Cohen
Université de Paris-Nord
Avenue J.B. Clément
93430 Villetaneuse, France
Tél. 49 40 30 00 - Fax: 49 40 33 33

Durée : De 1983 à juin 1992

Financement :
- Education Nationale
- Université Paris-Nord

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans plusieurs écoles maternelles et primaires de la région de la Seine Saint Denis, utiliser les nouvelles technologies de l'information dans l'apprentissage de la langue écrite chez les jeunes enfants, qu'ils soient : non-francophones, illétrés, déficients auditifs ou atteints de graves troubles du comportement.

Mise en oeuvre :

Les technologies utilisées dans les écoles sont le micro-ordinateur équipé de synthèse vocale. Le projet se présente sous le schéma d'une recherche-action-formation dans laquelle tous les acteurs universitaires ou praticiens ("instituteurs-chercheurs") ont le même rôle. Les objectifs de la recherche, les hypothèses de travail et l'organisation de la classe sont définis en commun par l'équipe au cours de l'avancement des travaux. Des enregistrements vidéo des situations dans les classes sont analysés par l'équipe pour s'orienter vers des voies plus riches que d'autres.

Produits :

Rapport final publié en décembre 1990.

UNIVERSITE DE PARIS XI
LABORATOIRE DE RECHERCHE EN INFORMATIQUE

Titre du projet : APLUSIX

Personne à contacter : Jean-François Nicaud
Maître de Conférence
Université de Paris XI
Bâtiment 490
91405 Orsay Cedex, France
Tél. 69 41 67 50

Durée : Début du projet : 1983

Financement :
- Programme de recherche coordonnée du Centre National de la Recherche Scientifique en Intelligence Artificielle
- Participation d'Apple
- Programme de recherche PIRTTEM du Centre National de la Recherche Scientifique

Universités associées :
- Université de Paris VI (Informatique)
- Université de Paris VIII (Psychologie Cognitive)

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Avec l'aide de deux enseignants d'un lycée (2ème cycle de l'enseignement secondaire), étudier la conception et la réalisation d'un logiciel d'entrainement dans une partie de l'algèbre, ainsi que l'étude de l'apprentissage de celle-ci. Ses perspectives sont l'extension du domaine (résolutions d'équations polynôminales, étude de fonctions), la modélisation de l'élève et la réalisation d'un module tuteur pilotant l'apprentissage.

Mise en oeuvre :

APLUSIX, environnement d'apprentissage fortement interactif, permet de se concentrer sur des composantes autres que le calcul. Il comporte deux modes d'apprentissages : **l'apprentissage par l'action** (l'élève conduit les calculs en choisissant l'expression à transformer et la transformation à appliquer) et **l'apprentissage par l'exemple** (l'élève observe des résolutions types. Le logiciel utilisant un concept "d'élève idéal" dont l'expertise reste incomplète, est capable de fournir des explications sur les actions et le choix de ces actions).

Produit :

La version actuelle est un prototype donnant lieu à des expérimentations et à des analyses de protocoles dans le domaine des factorisations de pôlynomes.

Germany

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BAVARIAN INSTITUTE FOR PEDAGOGY AND EDUCATIONAL RESEARCH

Title of project: ADVANCED COURSE IN INFORMATION SCIENCE AND DATA PROCESSING

Person to contact:
Dr. Alto Merkt
State Institute for Pedagogy and
Educational Research
Arabellastr. 1
D-8000 Munchen 81
Germany

Duration: From 1989 to 1991

Funding:
- Bavarian Ministry for Teaching and Culture, Science and Arts
- 88 Districts in Bavaria

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In all schools for handicapped children in Bavaria (main classes 8-9):

- To train teachers in the use of new information technologies.

Implementation:

It is compulsory in schools for handicapped children in Bavaria to have at least one teacher trained for a minimum of ten days in the use of the new information technologies. About 250 teachers will be trained between 1989 and 1992. A group of thirty-three local advisers were trained to deliver the course. Training is general and not related to particular pedagogics.

This project is linked to the Institute for In-service Training for Teachers and the Central Institute for Computers in Education in Bavaria.

Products:

A book about the use of computers in primary classes for handicapped children.

UNIVERSITY OF DORTMUND
CENTRE FOR PEDAGOGICAL STUDIES

Title of project: NEW INFORMATION TECHNOLOGIES AND BASIC COMPUTER LEARNING IN SECONDARY EDUCATION

Person to contact: Dr. Rolf v. Lüde
Didactic Higher Education Centre
University of Dortmund
Rheinlanddamm 199
4600 Dortmund 1, Germany

Duration: Ongoing from 1986

Funding: University of Dortmund

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In lower and upper secondary education (co-operation is not with specific schools, but with teachers and teacher trainers):

- To establish a computer educational system;
- To prepare students in the use of computers in their working life.

Implementation:

The project was conceived to fill two gaps: to accelerate in Germany the development of computer based education; to enable students and future employees to understand computer use in industry and society and to be capable of influencing its direction.

The project trains teachers and teacher trainers in secondary education. The organisers feel that in basic secondary computer education, the emphasis must be on an understanding of different kinds of user software and - even more important - detecting the opportunities and the risks of computer application in production and society. Given that 95 per cent of future employees will not be using programming techniques, emphasis is on application programs and software.

A 3 day training course is held three times per semester.

The project is orientated at the new Information Technology curriculum of the "Land Nordrhein-Westfalen".

Products:

A publication: "Filling the Educational Computer Gap: Computer Learning in Secondary Education in West Germany" by Rolf v. Lüde, University of Dortmund.

UNIVERSITY OF DORTMUND
DEPARTMENT OF PEDAGOGY

Title of project:	**COMPUTER APPLICATION IN PRIMARY SCHOOLS**
Person to contact:	Prof. Karl A. Wiederhold University of Dortmund Institut für Schulpädagogik und Allgemeine Didaktik Postfach 50 05 00 4600 Dortmund 50, Germany
Duration:	From Autumn 1985 to December 1988
Funding:	– Ministry of Education of North-Rhine Westphalia – German Ministry of Education and Sciences
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four schools in primary education:

- To research a methodological approach to a quality oriented study on computer applications;
- To gain insight into the possibilities and perspectives of a sound computer application in primary schools.

Implementation:

Each school has a specific research focus:

- Computer lessons in class and in work groups (three classes);
- Computers in free work time and in week-plan timetable (one class);
- Partner work with chosen drill and practice software in chosen fields (one class).

The project looked at the applications of computers for: learning processes; gender; appropriate use of computers; development of programs and simulations; adventure games. The equipment used was Apple, Atari or Commodore.

Members of the research group were pupils, teachers students and researchers.

A report on the results of the research was carried out on the attitudes of pupils, teachers and parents. It includes recommendations about the types of hardware and software to be chosen at primary level of education and further research to be undertaken.

Products:

A publication: "Computers in Primary Teaching: Possibilities and Educational Perspectives", H. Mitzlaff, K.A. Wiederhold, Hamburg 1990.

UNIVERSITY OF KIEL
INSTITUTE FOR SCIENCE EDUCATION

Title of project:	USING THE COMPUTER IN SPECIAL EDUCATION (COMPASS)
Person to contact:	Prof. Uwe Hameyer IPN University of Kiel Olshausenstr.62 D-2300 Kiel 1 Germany Tel. 431/880 40 58 - Fax: 431/880 15 21
Duration:	From June 1986 to June 1990
Funding:	– Federal Ministry of Education and Science – Ministry of Education in Kiel – Institute for Science Education at Kiel University – Two Foundations
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In lower secondary and special education schools, involving more than 110 teachers:

To investigate the use of computers as a teaching and learning aid as well as a component of new technology education, with emphasis on special and pre-vocational training.

Implementation:

During the implementation, a tested program for Basic Information Technology Education (the Federal/Länder policy for introducing information technology in education) consisting of four sections was prepared:

- *Introductory Section:* Hardware, software;
- *Application section:* Word Processing, data base, spreadsheets, graphics;
- *Follow-up section:* Newspaper, comic story, group portrait, yearly calendar;
- *Basic information section:* Development and prognoses, abundant Information, effects on careers and society, computers and data protection.

Products:

The results are documented in a final report (1989) and a series of four issues about COMPASS.

UNIVERSITY OF OLDENBURG
DEPARTMENT OF INFORMATICS

Title of project:	**PROJECT TO LINK UNIVERSITIES AND TEACHING ORGANISATIONS (PLUTO)**
Person to contact:	Prof. Peter Gorny Department of Informatics University of Oldenburg Postfach 2503 D.2900 Oldenburg, Germany Tel. 441 798 29 01 – Fax: 441 798 2155
Duration:	From September 1990 to August 1992
Funding:	– COMETT II (Commission of the European Communities Project) – Private Enterprise
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

PLUTO is a European education, industry and government project, the aim of which is to raise the level of information technology literacy and language skills in teacher training, schools and industry through practical networking. Manchester Polytechnic is the organiser of the Project, which links the University of Vienna, Austria, the Free University of Brussels, Belgium, the University of Oldenburg, Germany, the University of Patras, Greece, and the University of Falun-Borlange, Sweden.

Aims:

In one lower secondary, two lower and upper secondary and one vocational school:

- To enhance new information technology training in Europe via co-operation based on the use of the electronic network EARN (European Academic and Research Network).

Implementation:

The skills covered range from those in which some expertise exists already but where there is need for enhancement (e.g. database and spreadsheet up to the level of structured Query language) to areas in which the experience base is virtually nil (use of hypermedia). The project will engage in the preparation of support for training in all of these areas, while additionally developing the use of networking as a modality for collaboration.

Products:

Published training strategies; published support materials, including manuals and videos (minimum of five); identification and dissemination of specifications for futher development, based on analysis of user and group needs; electronic publication of a Newsletter to disseminate information about project development; paper publication of a series of reports on project achievements.

Final report 1994.

Ireland

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UNIVERSITY COLLEGE, DUBLIN
COMPUTING SERVICES AND DEPARTMENT OF EDUCATION

Title of project: COMMUNICATIONS SKILLS USING A WIDE-AREA COMPUTER NETWORK

Person to contact: Dr. Aine Hyland
University College Dublin
Education Department
Dublin 4, Ireland

Tel: 01-693244 – Ext. 8519

Duration: From October 1989 to June 1991

Funding:
- Computing Services, UCD
- Dalkey National School Parent Teacher Association

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

- To introduce children of a primary school (8 grades, from four years of age upwards) to the use of computer technology as a tool to be used un conjunction with their school work.
- To prototype the use of wide area networks as a means of communicating and engaging in collaborative projects with peer groups in other parts of Europe and of the world.

Implementation:

Childrens use two computers and they have access with a modem to the EARN/BITNET network. Through correspondence between the children and those in schools throughout the English-speaking world, they can share their ideas and stories.

Products:

Pupils have developed word-processing and writing skills as a result of this Project and have built up friendships with children in other parts of the world.

Final report in September 1991.

St. PATRICK'S COLLEGE
EDUCATION DEPARTMENT

Title of project: LOGO ENRICHMENT FOR MATHEMATICALLY ABLE CHILDREN

Person to contact: Dr. Sean Close
St. Patrick's College
Drumcondra
Dublin 9, Ireland
Tel: 01376191

Duration: From January 1985

Funding: St. Patrick's College

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

- To enhance and extend the mathematical knowledge of children and raise the level of their problem-solving skills.
- To develop self-motivation and self-reliance in children.
- To develop and test course materials and teaching strategies for using LOGO as a tool for learning.

Implementation:

In ten schools/colleges distributed around the country, pupils in the age range 8 to 14 years are selected for extra-curricular courses (25 hour blocks on Saturdays/evening/summer vacations) on the basis of their perfomance on the Raven's Progressive Matrice and the Drumcondra Mathematics Tests. Each year, 300 able children participate in the courses.

The twenty tutors are primary and secondary teachers who are interested in using LOGO as a tool for learning. A variety of LOGO microworlds are used to provide problem-solving experience for the pupils.

Products:

Pretest - Post-test studies have been carried out to assess the impact of the course on pupils mathematical knowledge. Video-tapes have been made of some the children while they are solving problems and they have been used to analyse the problem-solving behaviour of the children.

Papers have been published from time to time.

THOMOND COLLEGE OF EDUCATION
PHYSICS DEPARTMENT

Title of project: MICROPROCESSORS FOR CONTROL AND MONITORING

Person to contact: Dr. John O'Brien
Head of Physics
Thomond College of Education
Plassey Technological Park
Limerick, Ireland

Tel: (353) 61 334488 – Ext. 3001

Duration: From March 1981 to 1985

Funding: Ministry of Education

Associated Universities:
- University of Limerick
- Regional Technical College, Waterford

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To monitor any developments with regard to this subject component in twenty-eight second level schools. To co-ordinate and support such programmes with a view to development.

Implementation:

A Steering Committee has been formed to oversee the project, which includes four teachers already active in the subject area. Material developed will be field tested in the selected schools. Seminars and meetings with teachers will be held to assist in the dissemination of information and project progress.

Products:

Framework for the course to be approved.

THOMOND COLLEGE OF EDUCATION
PHYSICS DEPARTMENT

Title of project:	**DEVELOPMENT OF HYPERCARD/HYPERPARD STACKS FOR USE IN TEACHING OF TECHNOLOGY**
Person to contact:	Dr. John O'Brien Head of Physics Thomond College of Education Plassey Technological Park Limerick, Ireland Tel: (353) 61 334488 – Ext. 3001
Duration:	From November 1990 to December 1991
Funding:	Ministry of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To produce specific applications of object-oriented software in the form of hypertext systems for use in the teaching of the new Junior Technology syllabus. Five lower secondary schools are involved in this project.

Implementation:

These systems allow powerful applications to be built which have a very user-friendly interface while at the same time allowing modifications and extensions to be incorporated by the user. There are at least two systems, one running on Apple Mac's (Hypercard) and the other on MSDOS compatible machines (Hyperpad). Applications built on one system are easily translatable to the other.

Products:

The units would be produced by teachers with an initial training in the use of the object-oriented software. On completion of the project, the units would be available for use immediately in schools.

An additional benefit would that a nucleus of expert teachers would then be available to develop further applications and to train other teachers in the use of such systems.

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UNIVERSITE DE FLORENCE
DEPARTEMENT DES SCIENCES DE L'EDUCATION

Titre du projet : **LA TECHNOLOGIE INFORMATIQUE APPLIQUÉE A L'ENSEIGNEMENT DES LANGUES : DÉVELOPPEMENT D'UN PROTOTYPE**

Personne à contacter : Professeur Lydia Tornatore
Faculté de l'Éducation
Département des sciences de l'éducation
Via Cavour 82
50129 Florence, Italie

Tél : 2757 int. 761 ou 748

Durée : De 1989 à 1991

Financement : Centre National de la Recherche (pour l'équipement)

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Evaluer, dans une école du niveau secondaire inférieur, les possibilités fournies par le language informatique "Prolog" dans l'enseignement des langues.

Mise en oeuvre :

La première phase a concerné la préparation d'un logiciel en Prolog ; les étudiants qui l'utiliseront devront définir les composants d'une phrase et certaines règles syntaxiques afin que l'ordinateur puisse utiliser correctement les modèles linguistiques en reconnaissant des éléments similaires dans des contextes différents

C'est pour la deuxième phase qu'il est prévu une collaboration avec les enseignants qui devront tester l'environnement informatique et aider à son adaptation dans le contexte de l'activité de la classe.

Produits :

Un logiciel en Prolog pour l'enseignement des langues. Cet outil fera suite aux réalisations antérieures de videoécriture et traitement de texte dans le même domaine.

UNIVERSITY OF GENOVA
DEPARTMENT OF MATHEMATICS

Title of project: INTEGRATION OF COMPUTER SCIENCE AND MATHEMATICS

Person to contact: Fulvia Furinghetti
Dipartimento di Matematica dell'Universita di Genova
Via L.B.Alberti, 4
16132 Genova, Italy

Duration: Ongoing

Funding: National Council for Research (CNR), Italy

Associated Universities:

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four upper secondary and technical schools (14 to 19 years):

- To integrate the teaching of computer science and mathematics.

Implementation:

The project concerns the training and re-training of in-service mathematics teachers in computer science and the problem of integrating computer science in the mathematics curriculum.

Monthly meetings are held of all the personnel involved.

Products:

Teacher training courses.

UNIVERSITY OF MACERATA
DEPARTMENT OF PHILOSOPHY AND HUMAN SCIENCES

Title of project: NEW INFORMATION TECHNOLOGIES IN SCHOOLS

Person to contact: Prof. Anne Aefelli *Galleiz*
University of Macerata
Department of Philosophy and Human Sciences
V. Garibaldi 20
62100 Macerata, Italy

Duration: January 1991 to June 1992

Funding: University of Macerata

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one upper secondary school:

- To study the interaction between students and machines: the particularity of communications and learning with the new information technologies.

Implementation:

The teachers in the school will organise learning situations for their students through the use of computers and other educational technology. The work will be video-recorded for discussion by school teachers and researchers.

The project is organised through regular meetings between students and teachers and between teachers and researchers.

Products:

Final Report in Autumn 1992.

UNIVERSITY OF PARMA

Title of project: INTERPROVINCIAL LABORATORY OF INFORMATICS

Person to contact: Prof. Giovanni Dario Andreetti
University of Parma
Viale delle Scienze
I - 43100 Parma, Italy
Tel: (521) 2041 - Fax: (521) 204340

Duration: From January 1987 to December 1989

Funding:
- The University of Parma
- The region and provinces

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In all lower and upper secondary schools in the provinces of Parma (about thirty) and Piacente (about twenty):

- To enable teachers to requalify in the use of new technologies.

Implementation:

The project established a network through radio broadcasting of programs, courseware and exercises and a telephone close-up for question. A regional RAI (Italian Radio) program sent bits through a device constructed in Parma, able to add digital data to the analogical signal of the radio. A normal radio set was used as a modem for the computer input. A total of more than two hundred computers have been involved in the project, reaching not less than six hundred teachers.

In a second project, a telephonic asynchronous network was set up connecting all the secondary schools for: administration duties, bulletin board system, diffusion of tests of public domain programs, evaluation network of commercial programs.

Meetings at policy and decision-making level, once per year. Metings at technical-scientific level 6-7 times per year.

Products:

Final report December 1990.

UNIVERSITY OF PARMA
INSTITUTE OF STRUCTURAL CHEMISTRY
INSTITUTE OF ORGANIC CHEMISTRY

Title of project:	**TEACHING CHEMISTRY**
Person to contact:	Prof. Giovanni Dario Andreetti University of Parma Viale delle Scienze I - 43100 Parma, Italy Tel: (521) 2041 - Fax: (521) 204340
Duration:	From November 1989 to June 1990
Funding:	– The University of Parma – The Province
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In upper secondary schools of Parma and in the province of Parma:

– To enable the requalification of chemistry teachers through the use of new information technologies.

Implementation:

The project operates through extensive usage of programs from the SERAPHIM project and other new technology applications, such as videodiscs. It also involves the study of new methods of evaluation and modern techniques of chemical analysis through some training in the laboratory.

All the teachers participated in the writing of the final report.

Products:

Final report July 1990

UNIVERSITY OF PAVIA
UNIT OF COMPUTER ASSISTED LEARNING

Title of project: THE COMPASS PROJECT

Person to contact: Prof. F. Bertè
Unit of Computer Assisted Learning
University of Pavia
27100 Pavia, Italy

Duration: Ongoing from 1987

Funding:
- Regional Authority
- The University of Pavia

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In all the lower and upper secondary schools, whether State-run or private, in the Province of Pavia:

- To develop a successful teacher training model for computer assisted learning.

Implementation:

The Compass project may be defined as an example of an alternative to the "cascade" model (long courses for selected teachers who teach their colleagues on their return to schools) which has evolved self-training techniques for groups of teachers. All teachers, working in groups, are required to construct computerised teaching units as part of their training. The teachers have set up a co-ordinating committee which sets out the objectives that are to be achieved. Guidelines are suggested by the research team to the teachers' committee.

The University has no teaching role whatsoever in the project. It places software and hardware at the disposal of teachers who organise their own teaching. The research team's role is to monitor the success of the model adopted, to measure the quality of learning and above all to carry out field research into teacher training models.

The project operates through seminars for teachers held in the spring over a period of ten weeks.

Products:

Interim reports. Dissemination through publications, questionnaires, conferences and discussions. A book at end 1990/early 1991.

UNIVERSITY OF ROME "LA SAPIENZA"
DEPARTMENT OF THE PSYCHOLOGY OF DEVELOPMENT

Title of project:	Phase 1. **LINGUISTIC ABILITIES AND COMPUTER USE** Phase 2. **WRITING AND KNOWLEDGE REPRESENTATION THROUGH THE COMPUTER**
Person to contact:	Pr. Clotilde Pontecorvo University of Rome "La Sapienza" Faculty of Educational Sciences Via dei Marsi 78 00185 Roma, Italy
Duration:	Phase 1. From October 1986 to October 1988 Phase 2. From October 1988 to December 1991
Funding:	– National Council of Research – Ministry of Universities and Research – Olivetti (hardware equipemnt)
Associated Universities:	University of Florence

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In seven primary and three lower secondary schools:

- *Phase 1.* To investigate the use of a particular language software for developing metalinguistic skills in children;
- *Phase 2.* To develop the practical application of the software.

Implementation:

Phase 1. A metalinguistic courseware has been developed for the project. It involves seven programs aimed at developing different types of "stories" (with more or less restraints), different modes of text composition and ways of analysing syntactical structures. Effects of this courseware on children's text composition and metalinguistic skills have been tested both through individual interviews and analytical observation of peer linguistic interactions.

Phase 2.

a) Use of the computer as a desktop publishing tool to produce school/classroom newspapers;
b) Use of a word processor to help with childrens' text planning, generating and revising;
c) Use of a database as a teaching tool. A possible teaching curriculum is being developed, so that children can examine themselves in the activity of data collection, recording, recover and further elaboration.

Evaluation is carried out by comparing experimental with matched control groups.

Products:

Phase 1. Final report published: A. Pontecorvo, C. Zucchermaglio and R. Taffarel, The Computer as an Educational Tool in Metalinguistics in "The School Computer and Language, Loescher,Torino, 1989, pp.171-231. A. Calvani editor.

Phase 2. Final report March 1992.

UNIVERSITY OF SIENA
DEPARTMENT OF MATHEMATICS

Title of project:	**INFORMATICS, LOGIC AND THE LEARNING PROCESS**
Person to contact:	Prof. Alfio Andronico Department of Mathematics University of Siena Via del Capitano 15 53100 Siena, Italie
Duration:	Ongoing from December 1987
Funding:	– Ministry of Public Education – Ministry for Universities and Scientific and Technological Research
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In three primary and lower secondary schools:

- To study the role of the computer methodology and materials in the teaching and learning processes.
- To study the use new information technologies in schools, in particular to investigate the links between informatics, logical thinking and the learning process.

Implementation:

Particular attention is given to: use of new information technologies in the development of conceptual and logical thinking (inductive and deductive, etc.); the contribution of informatics for the learning of conceptual thinking in various disciplines (language, mathematics, etc.); the potential and the limits of logical programming and its relation to the above two points.

An interactive tutorial system based on LOGO has been established for the didactics of geometrical concepts (isometrics in particular). An important aspect of the project is to integrate research on the processes of learning with the application of the results of the didactic experiments. Relations and analogies with the didactic of various disciplines are studied.

Products:

The definition of a basic system model with the design of an Intelligent Tutoring System is the first step. For further development it is planned to use an Educational Laboratory which integrates VIdeo, Audio and Computer means (VIDAC).

Japan

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GIFU UNIVERSITY
CENTRE FOR CURRICULUM RESEARCH AND DEVELOPMENT

Title of project: DEVELOPMENT OF COURSEWARE FOR LEARNING AND ESTABLISHMENT OF DATABASES FOR EDUCATIONAL MATERIALS

Person to contact: Prof. Tadahiko Gotoh
Centre for Curriculum Research and Development
Faculty of Education
Gifu University
1-1, Yanagito, Gifu-shi
Gifu-ken 501-11, Japan

Duration: Ongoing from 1980

Funding:
- Gifu University
- Kawashima-machi Education Board
- Centre for Development of Learning Information Resources
- Gifu-ken

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

For two schools, primary and lower secondary:

- To develop learning courseware;
- To establish a database for educational materials.

Implementation:

The project works through:

- Developing of an Instructional Learning System including individualised learning, (Computer Assisted Instruction);
- Developing of individualised learning materials;
- Developing of the curriculum in computer literacy for students;
- Development of the Kawashima Data Processing System (KDPS), including Computer Managed Instruction;
- Development of an in-service teacher training program for teachers.

Communication between university and schools is established through electronic mail network system.

Products:

Publication of Technical Reports.

JOETSU UNIVERSITY OF EDUCATION
CENTRE FOR EDUCATIONAL RESEARCH AND DEVELOPMENT

Title of project: EDUCATIONAL USES OF COMPUTERS AND DEVELOPMENT OF TRAINING PROGRAMMES FOR TEACHERS

Person to contact: Prof. Masatoshi Nambu
Joetsu University
Centre for Educational Research and Development
7-2, Nishishiro-machi 1-chome, Joetsu-shi,
Niigata-ken 943, Japan

Duration: From April 1985 to March 1993

Funding: Joetsu University of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary and lower secondary schools and in Joetsu Audio-visual Library (a non-formal education institution):

To enhance the computer literacy of teachers:

- To appreciate the software and courseware developed in schools;
- To train the leaders of teachers groups in the educational uses of microcomputers.

Implementation:

Training programmes are organised as follows:

- Basic courses for educational uses of microcomputers (3 days);
- Computer programming course (for beginners, and intermediate level, 4 days each);
- Computer assisted learning courseware development course (3 days);
- Dataprocessing course for classroom observation techniques.

The courses include both lecures and hands-on practice. A beginner's course consists of operation of microcomputers: spreadsheet, graphics, sociometry software, and databases. Lectures cover the operating system and structure of the microcomputer system, basic strategies for educational uses of microcomputers and problems and issues of future uses of microcomputers in education. The project is linked to the Municipal Education Board, Joetsu-shi and the Prefectural Education Board, Niigata-ken.

Products:

Computers Uses in Education Vols. 1 & 2 (published).
Computers Uses in Education Vols. 3, 4, 5 & 6 (to be published).

NARUTO UNIVERSITY OF EDUCATION
DEPARTMENT OF SCHOOL EDUCATION

Title of project:	**CO-OPERATIVE PROJECT ON THE PROMOTION OF INFORMATION LITERACY**
Person to contact:	Prof. Fumihiko Shinohara Naruto University Department of School Education Takashima, Naruto-shi, Tokushima 772, Japan
Duration:	From April 1982 to March 1991
Funding:	– Chiyoda-ku Ward Education Authority – Mitsubishi Electric Co. Ltd. – Fujitsu Co. Ltd.
Associated Universities:	– Tokyo Gakugei University, Center for Educationl Technology

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one in Tokyo in lower secondary school:

– To develop computer literacy and its dissemination and use:

Implementation:

Researchers from the two universities and staff from Ward Education Authorities discussed the project and came to an agreement on research objectives, organisation, teacher training programme, development and evaluation of courseware and authoring software, and the budget.

The project is designed in accordance with situation of the school, the subject matter, teacher competencies and facilities already installed. 46 microcomputers and 2 printers equip the school.

Once every two weeks, teachers and researchers meet at the school to exchange information and to discuss problems.

Products:

Final Report March 1991

TOKYO GAKUGEI UNIVERSITY
CENTRE FOR EDUCATIONAL TECHNOLOGY

Title of project: DEVELOPMENT OF CAI COURSEWARE AND AUTHORING SYSTEM

Person to contact: Prof. Fumihiko Shinohara
Tokyo Gakugei University
Centre for Educational Technology
1-1, Nukuikita-machi 4-chome
Koganei-shi, Tokyo 184, Japan

Duration: From April 1987 to March 1991

Funding: Stratford Computer Centre Co. Ltd.

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In Chiba Municipal Education Centre, for primary and lower secondary experimental schools:

- To establish education which is relevant to children's ability and aptitudes;
- To upgrade quality in educational activities and teacher competences;
- To promote information technology literacy for teachers and pupils.

Implementation:

The project is carried out through four objectives:

1. Establishement and development of a hardware system (52 micro-computers, 2 video editing machines, 2 laser disks 2TV Cameras);
2. Development and evaluation of courseware and authoring software;
3. Development and evaluation of a teacher training programme;
4. Application of new information technologies to non-formal education settings.

In order to pursue these objectives, education trainers, staff from the enterprise, teachers from experimental schools and faculty members from the University meet regularly to exchange information (7 times a year).

Products:

Final report March 1991.

CENTRE FOR LEARNING SOFTWARE RESOURCES AND INFORMATION RESEARCH, TOKYO

Title of project:	RESEARCH ON EDUCATIONAL USES OF MICROCOMPUTERS
Person to contact:	Prof. T. Nakagawa Centre for Learning Software Resources and Information Research Daikan' yama-Sagwa Building 2F 30-16, Ebisu-nishi 1-chome, Shibuya-ku, Tokyo 150, Japan
Duration:	From 1989 to 1993
Funding:	– Universities – Schools – Japan IBM Company Ltd.
Associated Universities:	– Gifu University – Hokkaido University of Education – Naruto University of Education – Tokyo Gakugei University, and – Tokyo University of Electronics

BRIEF DESCRIPTION OF THE PROJECT

Aims:

For eleven primary and lower secondary schools:

- To develop educational materials and a database system for computer literacy;
- To develop the resources for learning courseware based on the school curriculum;
- To develop instructional methods in educational uses of computers.

Implementation:

The Project is a five-year Plan involving the five universities, the eleven primary and lower secondary schools and the Educational Centres at Prefecture Level. It has been initiated by the Centre for Learning Software Resources and Information Research.

Training textbooks are provided; software and educational materials are developed and tested; research and development of a network system has been carried out. The research group meets five to six times a year. A general assembly is held twice a year.

Products:

A monthly journal entitled "Learning Resources and Information" is published.

TSUKUBA UNIVERSITY
CENTRE FOR SCIENTIFIC INFORMATION PROCESSING

Title of project:	EDUCATIONAL COMPUTING
Person to contact:	Prof. Kazuhiko Nakayama Centre for Scientific Information Processing Tsukuba University 1-1, Tenno-dai 1-chome, Tsukuba-shi, Ibaragi-ken 305, Japan
Duration:	Ongoing since April 1988
Funding:	– Tsukuba University – Local Education Boards
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

For primary, lower secondary and upper secondary schools, one in Tsukuba-shi and the others all over Japan:

- To develop a frame-type Computer Assisted Instruction system, with software and courseware development;
- To exchange Computer Assisted Instruction courseware developed by school teachers;
- To research and develop transportability of software and courseware between different computer systems;
- To develop an in-service teacher training programme for various types of school teachers.

Implementation:

Training courses are developed with the help of local government, as well as with an enterprise (Sharp Electric Company Ltd.). These courses involve lectures and videos and hands-on practice. The content is a basic introduction to computer assisted learning, courseware design, data input such as tables and graphics, design and development of a guidebook for students and teachers. Trials of the courseware developed are carried out

Some 20 training courses a year are held all over Japan. Over 500 teachers have been trained.

Products:

Teacher training courses.

Luxembourg

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CENTRE UNIVERSITAIRE DU LUXEMBOURG

Titre du projet : UTILISATION PEDAGOGIQUE DES NOUVELLES TECHNOLOGIES

Personne à contacter : J.F. Roger Strainchamps
Centre Universitaire du Luxembourg
162 A, Avenue de la Faïencerie
L-1511 Luxembourg
Tél. 2 16 21

Durée : En cours

Financement : Centre universitaire du Luxembourg

Universités associées : None

BRIEF DESCRIPTION OF THE PROJECT

Objectifs :

ormer les enseignants à l'utilisation pédagogique des nouvelles technologies dans le domaine du vocabulaire, de la Publication Assistée par Ordinateur en éducation artistique et de l'enseignement de la chimie dans les sections artistique et musicale.

Mise en oeuvre :

Au niveau de la formation initiale, il existe un cours obligatoire de technologies nouvelles comprenant les options suivantes : initiation à l'usage de l'ordinateur, cours approfondi d'informatique, initiation à l'audio-visuel et enseignement programmé.

Au niveau de la formation continue, l'Université propose un stage d'initiation pour les professeurs de mathématiques, des séjours à l'étranger, des ateliers de travail et des conférences.

Produits :

Elaboration de moyens didactiques.

The Netherlands

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FREE UNIVERSITY OF AMSTERDAM
CENTRE FOR GEOGRAPHY EDUCATION

Title of project:	**LEARNING THROUGH ADVENTURE: FLEXIBLE ACTOR-ORIENTED COMPUTER SIMULATION AS A MEANS TO DIFFERENTIATED LEARNING IN GEOGRAPHY**
Person to contact:	Dr. H.C. Trimp Department of Teacher Training for Geography Education Free University of Amsterdam De Boelelaan 1115 1081 HV Amsterdam, The Netherlands
Duration:	From September 1987 to September 1991
Funding:	Free University of Amsterdam
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

This project evolved from the NIVO Project 1985-1988 (New Information Technology in Secondary Education). Responsibility is now in the hands of the new Project PRINT 1988-1992.

Aims:

In secondary schools:

- To investigate how a flexible, actor-oriented approach contributes to learning results in geography, in heterogenous groups;
- To study the interaction between student characteristics (motivation, pre-knowledge and experience, learning strategy), and type of learning environment (treatment).

Implementation:

The project sees the acquisition of geographical skills as involving the linking of knowledge from individual experience with more abstract, aggregated knowledge about regions. A specific computerised authoring and learning system has been designed and developed to allow for: structuring knowledge in a methodical way, in order to simulate a geographical situation; role-based interaction about people, places and regions; user driven decisions on route and data-interrogation; program-driven registration of user-decisions.

Co-operation with the schools involves the development, testing and rewriting of software and other learning materials, the educational research and teacher-training. The combination of these three activities is considered essential to the project.

Products:

Final report September 1992.

FREE UNIVERSITY OF AMSTERDAM
DEPARTMENT OF COGNITIVE PSYCHOLOGY

Title of project:	**MODEL SCHOOL PROJECT WEST-NETHERLANDS**
Person to contact:	Dr. J.J. Beishuizen Free University of Amsterdam De Boelelaan 1111 1081 HV Amsterdam, the Netherlands
Duration:	From May 1987 to January 1992
Funding:	– Institute for Educational Research in the Netherlands – Ministry of Education – PRINT Programme – The Universities of Amsterdam and Utrecht
Associated Universities:	– University of Utrecht (Research Group on Mathematics Education and Educational Computer Centre)

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In a secondary school (lower and upper) with 1 400 students:

- To study the effects of the large scale introduction of computers in a secondary school;
- and in particular, the effects on the management structure of the school, the necessary support for teachers, and the changes in the process of teaching and learning.

Implementation:

The school was taken as a "model" and equipped with 49 computers. Nine subject areas are involved in the developing and testing of a series of experimental lessons. Descriptive methods are used for recording large scale effects, such as: attitudes and opinions of teachers towards using computers in education: the facilities provided (release hours, hardware and software, technical and pedagogical support).

The success of the lessons is evaluated and recorded.

Products:

This project is part of the national PRINT programme (1988-1992).

Final report April 1992.

EINDHOVEN UNIVERSITY OF TECHNOLOGY

Title of project:	**PRINT/VO: COURSES FOR TEACHERS IN INFORMATION TECHNOLOGIES**
Person to contact:	Dr. S. Feiner-Valkier Education in Physics Faculty of Physics Eindhoven University of Technology N-laag, Postbus 513 5600 MB Eindhoven, The Netherlands
Duration:	From August 1989 to July 1992
Funding:	– PRINT/VO – University of Technology of Eindhoven
Associated Universities:	– University of Amsterdam, Education in Physics (coordinator)

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In all upper secondary schools in the Netherlands:

– To train physics teachers in the context of a new national curriculum changed in 1990.

Implementation:

The national curriculum for physics at secondary schools was changed in 1990. The most important change was the introduction of information technologies in this curriculum. The University of Eindhoven has accepted the responsibility to run nine of the 30 courses organised nationally to train physics teachers for this change. Each course consists of 15 meetings of three hours. Every school in the Netherlands is obliged to send one physics teacher on this course, which is given at various locations across the country.

The main part of the courses consists of practical exercises and theoretical background. The courses and school material (hardware and software) were developed with the help of schoolteachers.

On completion of the course, teachers receive a non-award certificate.

Products:

Teacher training in the new technologies, as part of the PRINT national project 1988-1992.

STATE UNIVERSITY AT GRONINGEN
DEPARTMENT OF TEACHER TRAINING

Title of Project:	**NEW INFORMATION TECHNOLOGY FOR SECONDARY EDUCATION (NIVO)**
Person to contact:	Drs. F.M. Muilhema State University of Groningen Department of Teacher Training Westersingel 30 9718 CM Groningen, The Netherlands
Duration:	From September 1988 to May 1989
Funding:	NIVO Project
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

NIVO was the nationwide project (1985-1988) in the Netherlands designed to provide secondary schools with the means of using modern technologies.

Aims:

In seven lower and upper secondary schools:

- To provide schools with the means to use information technologies in teaching history.

Implementation:

- Hardware and basic software have been provided by NIVO;
- Specific software has been produced;
- Teacher training was carried out in two stages: general introduction of information technologies and specialised courses for subject teachers.

Products:

Internal report published in June 1989.

STATE UNIVERSITY AT GRONINGEN
DEPARTMENT OF EDUCATIONAL SCIENCE

Title of Project:	**RITS (Reflexive Intelligent Tutoring Systems)**
Person to contact:	Dr. A. de Haan Department of Educational Science Faculty of Pedagogical Studies Grote Rozenstraat 34 9712 TJ Groningen, The Netherlands Tel. 50 63 65 61
Duration:	Ongoing since January 1990
Funding:	Ministry of Education
Associated Universities:	Higher Education Institute of Windesheim

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In vocational schools, in teaching spatial mathematics:

- To develop an interactive environment (The "co-operative" computers).

Implementation:

The methodology involved is called Reflexive Intelligent Tutoring Systems. It is based on a procedural approach towards human computer interaction and parallels the pragmatic approach towards human (linguistic) interaction. This method uses techniques from Artificial Intelligence to establish a co-operative partner for the user.

Monthly meetings are held.

Products:

RITS software in Mathematics is expected.

STATE UNIVERSITY AT GRONINGEN
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

Title of project:	AUTOMATIC DATA AQUISITION IN MATHEMATICS EXAMINATION
Person to contact:	Dr. S.L. Kemme State University of Groningen Faculty of Mathematics and Natural Sciences Broerstraat 5, POB 72 9700 AB Groningen, The Netherlands Tel (050) 639 111
Duration:	From April 1988 to September 1991
Funding:	PRINT
Associated Universities:	University of Amsterdam

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In six secondary schools:

- To introduce new technologies in schools;
- To develop software and subject matter for a new implementation of Automatic data aquisition in the final examination of mathematics at secondary level.

Implementation:

Schools experiment with the materials developed at the Universities. They have an important influence on the final products.

Teachers and researchers meet monthly. Researchers visit classrooms to observe experiments.

Products:

Project is linked to PRINT another 5-year (1988-1992) national plan which aims at introducing new technologies in schools.

Final report September 91.

STATE UNIVERSITY AT GRONINGEN
DEPARTMENTS OF PHYSICS EDUCATION AND TEACHER TRAINING

Title of project:	**RESEARCH ON MOTIVATION ASPECTS CONCERNING NEWLY DEVELOPED CURRICULUM MATERIALS FOR INFORMATION TECHNOLOGIES IN PHYSICS**
Person to contact:	Pr. P. Mazereeno State University at Groningen Departments of Physics Education and Teacher Training Nijenborgh 16 9747 AG Groningen, The Netherlands Tel 31 (50) 63 5364 – Fax: 31 (50) 63 5380
Duration:	From January 1989 to December 1991
Funding:	– Government – State University at Groningen
Associated Universities:	Northern Education Institute Leenwavden

BRIEF DESCRIPTION OF THE PROJECT

The project is part of the PBN project between the Universities of Amsterdam, Eindhoven, Nijmegen, Utrecht and Groningen.

Aims:

In two lower and upper secondary schools:

- To introduce new information technologies in the updating of the physics curriculum;
- To investigate the effects on the motivation of students on issues of the new curriculum;
- To prepare teachers to cope with these changes.

Implementation:

One of the issues in the updating of the physics curriculum in secondary schools is the introduction of new information technologies. Pupils have to deal with the technical background, the purpose and working of different automatic and logic systems, and with the use of microcomputers as a measuring instrument in experiments in physics. New materials are being developed and their effects and their motivation of students are evaluated.

Teacher training courses are organised for teachers to help them cope with the new aspects of the curriculum. Meetings are held regularly, alternating between the schools and the University. Trainee teachers carry out some well-defined roles in the research.

Products:

New curriculum material.
Final report January 1992.

STATE UNIVERSITY AT GRONINGEN
DEPARTMENTS OF CHEMISTRY EDUCATION AND TEACHER TRAINING

Title of project: RESEARCH ON EVALUATION CONCERNING NEWLY DEVELOPED CURRICULUM MATERIALS FOR INFORMATION TECHNOLOGIES IN CHEMISTRY

Person to contact: Dr. P. van Zandbergen
Departments of Chemistry Education and Teacher Training
State University at Groningen
Nijenborg 16
9747 AG Groningen, Netherlands
Tel: 31 (50) 63 5364 - Fax: 31 (50) 63 5380

Duration: From May 1990 to August 1991

Funding: The Government

Associated Universities: University of Amsterdam

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In five lower and upper secondary schools:

- To introduce new information technologies in the updating of the curriculum for chemistry;
- To develop new materials for pupils and to investigate the effect on and motivation of pupils in the context of new issues its the curriculum of chemistry in secondary schools.
- To prepare teachers to cope with these changes.

Implementation:

One of the issues in the updating of the chemistry curriculum in secondary schools is the introduction of new information technologies. Pupils have to deal with the technical background, the purpose and working of different automatic and logic systems, and with the use of microcomputers as a measuring experiment in experiments in physics. New materials are being developed, and being evaluated.

Teacher training courses are organised for teachers to help them cope with the new aspects of the curriculum. Meetings are held regularly, alternating between the schools and the University. Trainee teachers carry out some well-defined roles in the research.

Products:

Final report 1991.

UNIVERSITY OF TWENTE
DEPARTMENT OF COMPUTER SCIENCE

Title of project:	**INSTRUCTIONAL DESIGN FOR LEARNING TO PROGRAM IN A RELATIONAL DATABASE QUERY LANGUAGE**
Person to contact:	Dr. E.M. Van Dijk Department of Computer Science University of Twente PO Box 217 7500 AE Enschede, Netherlands
Duration:	From August 1987 to August 1991
Funding:	– University of Twente – Grant from the SVO Foundation
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two schools, lower and upper secondary:

- To study the problem-solving process in informatics;
- To consider the products of the problem-solving activities of students.

Implementation:

The course is concerned with the methodology of problem-solving. A comparison is made of two problem-solving strategies and the process and the resulting products are evaluated. Attention is paid to the effects of several cognitive styles (field dependence-independence, reflection-impulsivity, verbal intelligence) on the problem-solving behaviour of the students.

The first method ("top-down") consists of a global description of the problem, followed by breakdown into subproblems, each of which can be solved independently, also by dividing into further problems. Thus, the subprograms gradually get smaller. Eventually they are small enough to give the solution in a relational database Structured Query Language (SQL) immediately. In the second method, parts of the solution of the problem are worked out in detail immediately, although it is not yet clear how these parts fit into the final solution. The final solution is composed using the parts already worked out in detail.

Products:

This project was initiated by the University, but it is part of a major project initiated by the Ministry to study the wider implementation of information technology in schools.

Final report August 1991.

STATE UNIVERSITY UTRECHT
INSTITUTE OF EDUCATION

Title of project: USING COMPUTERS IN THE CLASSROOM

Person to contact: Dr. J.S. ten Brinke
IVLOS Institute of Education
Diwit Research Group
Utrecht University
Heidelberglaan 2
PO Box 81020
NL-3508 TC Utrecht, Netherlands
Tel: 31 30 53 2342 - Fax: 30 53 2741

Duration: From March 1989 to June 1991

Funding:
- State University of Utrecht
- IBM Nederlands, Videa Nederland
- Rijksinkoopbureau

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one upper secondary school (12-15 years):

- To increase knowledge of the possibilities of Information Technology applications at the level of the daily teaching of teachers in the Dutch secondary educational system.

Implementation:

This is a long-term research project dedicated to the respective pedagogies and methodologies of geography, history and modern languages. The didactic behaviour of individual teachers is seen as the decisive factor in the process of integration of the computer in subject teaching. Three fields of research are covered: 1) The relation between teaching style (presentation; information vs. elicitation; managing the discovery of learning process and Information Technology. 2) Classroom-management and Information Technology: the permanent availability of hardware and software in class and in the teacher's home; the total complex of didactic interventions and procedures in class and the preparation, execution and evaluation of lessons. 3) Integration of Information Technology in the daily teaching practices of the teacher: the possibilities of regular and integrated use of Information Technology by the teacher in all forms of curricula.

The project is a "Joint Study Agreement" between the State University of Utrecht and IBM Nederland.

Products:

Final report July 1991.

New Zealand

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MASSEY UNIVERSITY
EDUCATIONAL RESEARCH AND DEVELOPMENT CENTRE

Title of project: THE FREYBERG INTEGRATED STUDIES PROJECT

Person to contact: Dr. C. J . Patrick Nolan
Educational Research and Development Centre
Faculty of Education
Massey University
Private Bag
Palmerston North, New Zealand

Tel. 69 079

Duration: From January 1986 to December 1989

Funding:
- Massey University;
- IBM New Zealand Ltd.
- Ministry of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

The Freyberg Integrated Studies Project is a secondary schools curriculum research and development project. It progressively developed and field tested new types of integrated curricula across Grades 8 to 11 as an alternative to the traditional approach. Within these curricula, out of class activities, integrated curriculum materials and computer applications all play a key role.

Aims:

In one secondary school:

- To examine gender and ability differences in computer attitudes and experiences of a group of 176 secondary school students.

Implementation:

Students are exposed to a curriculum innovation involving three components: integration of core subjects, out-of-class activities which are the basis of in-class studies, and extensive use of computers using applications software. Comparison data were obtained from a class not involved in the programme but who had access to computers at school. The students provided data on: attitudes towards and uses of computers, preferences for and uses of various software packages; keyboarding skills, frequency of computer use, and subject preferences.

Males, overall, had significantly more exposure to computers based primarily on access to computers in the home. There was no significant difference in exposure to computers when home computers were excluded. With the exception of one class, there was no significant gender difference in attitudes toward computers. There were significant differences in preference patterns for school subjects and software packages.

Products:

Series of published articles, ongoing.

MASSEY UNIVERSITY
EDUCATIONAL RESEARCH AND DEVELOPMENT CENTRE

Title of project: MASSEY UNIVERSITY SCHOOL ADMINISTRATION BY COMPUTER PROJECT (MUSAC)

Person to contact: Dr. C. J. Patrick Nolan
Educational Research and Development Centre
Faculty of Education
Massey University
Private Bag
Palmerston North, New Zealand
Tel. 69 079 – Fax: 63 505 619

Duration: Ongoing from 1988

Funding: Self funding (from sales of software)

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In seven hundred schools (all levels):

- To provide support for school administration throughout New Zealand.

Implementation:

Two software packages are the flagship of MUSAC: 1) "Pupils Files" (a comprehensive database for the management of all information related to pupils). This package allows up to eighteen screens of pupil information, with date entry features, covering all those items required by the Ministry of Education in all types of schools, from pre-school through to adult students and night classes. It has many user definable features, including a list design module, integrated word processing module and pre-defined lists; 2) "School Accounts" (a comprehensive means of handling in-house accounting enabling schools to independently and efficiently manage their own finances). The package manages up to 26 different charts of accounts, each with up to 1000 user-specified ledgers.

Other packages available are: Marks Analysis: Electronic Markbook: School Timetable: Absences: School Wages: Resource Manager.

Products:

Software packages.
Series of published articles, ongoing.

MASSEY UNIVERSITY
EDUCATIONAL RESEARCH AND DEVELOPMENT CENTRE

Title of project: SCHOOLS SHARING INFORMATION NETWORK (SSINet)

Person to contact: Dr. C. J. Patrick Nolan
Educational Research and Development Centre
Faculty of Education
Massey University
Private Bag
Palmerston North, New Zealand
Tel. 69 079 - Fax: 63 505 619

Duration: Ongoing from 1988

Funding: Self funding

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

For schools all over New Zealand:

- To support the work of teachers by enabling them to share their best educational ideas and to gain national recognition;
- To enhance the educational effectiveness of schools.

Implementation:

The electronic network SSINet will use the latest computer technology to collect, process and disseminate the best teaching methods and strategies, curriculum ideas and approaches, and educational materials and resources developed by New Zealand teachers. The project will build upon recent school-based research and development projects which implemented computer applications across the curriculum, and resulted in more effective planning and collaboration in sharing information and ideas.
In collecting, generating and disseminating educational methods and models, SSINet will employ a number of media for the transfer of information ranging across satellite communications, telecommunication between remote computer terminals and a central computer.

IBM New Zealand Ltd provided the funding to set up the project.

Products:

Series of published articles, ongoing.

UNIVERSITY OF OTAGO

Title of project: INFORMATION TECHNOLOGY IN EDUCATION AND CHILDREN (ITEC)

Person to contact: Dr. Kwok-Wing Lai
Department of Education
University of Otago
P.O Box 56
Dunedin, New Zealand

Duration: From January to October 1990

Funding: University of Otago

Associated Universities:

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In a primary school:

- To investigate the conditions under which computer use in schools is associated with the development of higher level thinking and problem solving skills in children.

Implementation:

ITEC is an international Project which was initiated by the Bulgaria Committee for Science and Education and UNESCO. It concerns twenty four classrooms (9-10 years) and 25 classrooms teachers, representing seventeen countries.

With the help of the classroom teacher, the researchers observe both ordinary classroom lessons and lessons involving computer use in one particular class. Four 15-20 minute videotape segments have been made of each of the classes. Extensive information has been collected about the teachers, the schools, the educational environment in the schools and classrooms, the children themselves, the principals, the social interactions that characterise computer use in the classroom, the ways in which computers are used, and the reasons why the teachers believe the computer activities provide higher level learning experiences for their students. Data collected can provide cross-cultural comparisons.

Products:

Final report May 1991.

VICTORIA UNIVERSITY OF WELLINGTON
EDUCATION DEPARTMENT

Tittle of Project:	**COMPUTERS IN SCHOOLS**
Person to contact:	Barbara Craig Lecturer Victoria University of Wellington P.O. Box 600 Wellington, New Zealand Tel. 721.000
Duration:	Being developed
Funding:	Telecom New Zealand
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one primary school:

- To develop resources for the training of teachers in the use of information and communications technology.

Implementation:

The Project is a co-operative endeavour between the University, the school and the telephone company, Telecom. All areas of the primary school curriculum will be covered.

Students at Victoria University taking the Education Department course entitled "Children, Computers and Schools", will have the opportunity also to participate in the project.

Eventually a training team of university teachers, school teachers and Telecom communication technology experts will visit other schools in a training capacity.

Products:

Teacher training programs.

Norway

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HAMAR COLLEGE OF EDUCATION
INFORMATICS SECTION

Title of project: COMPUTERS FOR STUDENTS WITH SPECIAL NEEDS

Person to contact: Anne Berit Fuglestad
Hamar College of Education
Holsethgt. 31
N-2300 Hamar, Norway

Duration: From August 1988 to June 1989

Funding: Hamar College of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one school, in primary and lower secondary education:

- To link further teacher training in special education to special needs teaching in mathematics;
- To develop a computer program for mathematics, based on diagnostic tests of students.

Implementation:

Teachers involved in the project were training to teach children with special needs, and some had training in informatics. The program used pictures of hardcopy teaching materials and symbols and methods closely linked to traditional teaching methods.

Meetings were held approximately 2-4 times a week.

Products:

Final report June 1989.

HAMAR COLLEGE OF EDUCATION
INFORMATICS SECTION

Title of project: COMPUTER ASSISTED LEARNING

Person to contact: Anne Berit Fuglestad
Lecturer
Hamar College of Education
Holsethgt. 31
N-2300 Hamar, Norway
Tel: 65 22040

Duration: From August 1986 to December 1990

Funding: Ministry of Education and Research

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two schools, in primary and lower secondary education (1-6 grade, i.e. 6-12 years old):

- To develop the use of computers as a natural part of teaching and learning;
- To develop the children's feeling of control of the computer and to stimulate social training and discussions;
- To test the limitations of a programming tool "The Director" (developed by the Norwegian Ministry of Education) which combines interactive stories with separate program modules into one complete program.

Implementation:

Teachers had a one year course in informatics.

Different programs were used, particularly in Norwegian language and mathematics. In teaching language, word processing was used both for free writing and for exercises where pupils had to fill in the right word and correct mistakes. In mathematics, LOGO programming and problem solving in the LOGO environment were used, mainly with turtle-geometry. An adventure game was also designed to enable students to solve problems with fractions. In this software, "The Director" was used for programming and "De Lux - Paint" and a hand scanner were used for pictures.

Products:

Reports on word processing and LOGO activities have been published in June 1988.

The report on Adventure-Fractions, together with the test of the limitations of "The Director" concerning the designing of mathematics programs is expected in January 1991.

HAMAR COLLEGE OF EDUCATION
INFORMATICS SECTION

Title of project: COMPUTER AS A TEACHING TOOL: NORWEGIAN AS SECOND LANGUAGE

Person to contact: Anne Berit Fuglestad
Lecturer
Hamar College of Education
Holsethgt. 31
N-2300 Hamar, Norway

Duration: From September 1989 to May 1992

Funding:
- Hamar College of Education; Director of Schools; Schools Office, Hamar;
- Council for Refugees; Red Cross Nursery.

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two schools in pre-primary and primary education, working with non-Norwegian mother-tongue pupils, teaching Norwegian language and mathematics:

To use computers with concept keyboard in developing concepts:

- Beginning mathematics: relations, quantities, series, shapes;
- Introductory language teaching;
- Support for reading based on spoken language.

Implementation:

In the primary school, the work was done with children of age 5 to 8. The students were Vietnamese, Chinese, Iranian and Norwegian students with special needs.

The students use concept keyboard for communicating with the computer programs. Special overlays are made for the project with pictures, or text written in Norwegian, Iranian or Vietnamese.

The computer was not used in isolation, but integrated into the teaching and traditional materials.

Teachers had been trained in special education.

The working group met every two weeks, making materials and preparing software. The project planning group meets once a month.

Products

Final report September 1992.

STORD COLLEGE OF EDUCATION
PHYSICS DEPARTMENT

Title of project: THE COMPUTER AS A SENSING AND CONTROLLING INSTRUMENT - A TRIAL WITH 11-12 YEAR OLDS

Person to contact: Leif Wedoe
Stord College of Education
Physics Department
5414 Rommetveit, Norway

Duration: From October 1988 to June 1989

Funding: National Advisory Council for Schools

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In a primary school:

- To investigate how pupils (12-13 years) can acquire fundamental skills and develop a basic understanding of the laws of electricity and electronics and how the computer functions as a sensing/controlling instrument;
- To develop teaching strategies to counteract eventual significant differences in the achievements of the two sexes;
- To develop a scheme of work for teaching electricity, electronics and computer skills within the framework of the general curriculum.

Implementation:

The actual design and execution of the project was performed by the Stord College of Education. The project was a rather limited one, with two persons directly involved over 6 weeks with a total of 32 classroom periods.

Meetings were arranged informally, usually in conjunction with project work.

Teacher trainees were informed of the progress and main results of the project.

Products:

Final report Spring 1989.

STORD COLLEGE OF EDUCATION
MUSIC DEPARTMENT

Title of project: MICROCOMPUTERS AS AN AID IN CREATIVE MUSIC-MAKING FOR CHILDREN

Person to contact: Vidar Andersan
Music Department
Stord College of Education
5414 Rommetveit, Norway

Duration: From 1986 to 1991

Funding: Stord College of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In a primary school:

- To investigate how children between 10-13 years of age can use computers for creative music-making;
- To prepare the way for such projects on a larger scale, with co-operation between higher education and schools for future development.

Implementation:

The project was initiaited by Stord College of Education as a part of a larger project aiming at the development and construction of designs for music computer application. The project is seen as a preparatory one; therefore the scope and aims were rather limited.

Four studies were undertaken:

- Composing melodies from a text basis;
- Composing melodies from a triad scheme;
- Arranging the melodies;
- Experimenting with sounds; creating sound pictures.

Classroom trials were carried out, with tape-recordings being made of childrens' products.

The teacher involved made this experiment part of her inservice training. The project leader and project teacher were both teacher trainees. Regular planning meetings took place.

Products:

Final report 1991

TELEMARK COLLEGE OF EDUCATION
ART AND CRAFTS SECTION

Title of project:	MICROCOMPUTERS IN ART EDUCATION
Person to contact:	Steinar Kjosavik Telemark College of Education N-3670 Notodden, Norway Tel: 36-10200
Duration:	From January 1990 to Spring 1991
Funding:	– National Council for Primary and Secondary Education – Baerum Municipal Pedagogical Center
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one primary and one lower secondary school, in computer graphics:

To investigate the following questions:

- How microcomputers influence creative work;
- How it is possible to challenge the creative abilities more than the intellectual/cognitive/technical abilities;
- How microcomputers may improve the understanding of aesthetics, with special emphasis on the use of colours;
- How microcomputers may be used as a skech-book in an interactive creative and analysing process (important, as, when using computers, the process can be saved step-by-step and is reversible).

Implementation:

The project uses the Commodore Amiga computer and the program "DeLuxe Paint". The teacher trainee was responsible for a great part of the daily co-ordination. Technical training was provided for the teachers.

A second stage of the project is under development, based on the first stage report and evaluation.

Products:

An increase in teachers qualified in the use of New Information Technologies.

An advance in achieving the aim of the Norwegian Ministry of Education that the new technologies be part of all subjects in primary and secondary education.

A report was published at the end of the first phase of the project. A second report will be published in August 1991.

TELEMARK COLLEGE OF EDUCATION
CENTRE FOR PEDAGOGICAL RESEARCH AND DEVELOPMENT

Title of project:
Project 1: Process Writing on Microcomputers in Primary and Lower Secondary School
Project 2: "Autograf" as an Instrument for Teaching Norwegian in Primary School

Person to contact:
Prof. Dag Aanderaa
Telemark Research-Notodden
Telemark College of Education
N - 3670 Notodden, Norway
Tel. 036-10200 – 036-52253

Duration:
– *Project 1:* From January 1988 to November 1990
– *Project 2:* From November 1990 to November 1992

Funding:
National Council for Primary and Lower Secondary Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

Project 1: *In two classes of a primary/lower secondary school:*

– To develop methods for improving writing in Norwegian mother-tongue, especially process writing, on computers.

Project 2: *In two primary schools:*

– To develop methods for teaching process writing in Norwegian mother-tongue to small children (2-3 grade), using "Autograf", an advanced Word Processor with a rather simple user interface especially developed for teaching.

Implementation:

Project 1. Classes used Word Processor BRUM in their compositions, as an aid to pre-writing work and the first draft. Students were encouraged to read each others' compositions and respond. Thus, peer co-operation was increased. The method was also used to encourage students to write more and to do more revision.

Project 2: The project will investigate how "Autograf" is related to: the subject goals, knowledge, attitudes and skills; dissimilar goal-groups; the need to find solutions and take initiatives; the need for extra resources (teachers/grants); the need for special competence for teachers.

Teachers and researchers meet four times a year. The researcher attended many lessons in the schools, often giving advice to teachers.

Products:

First report in November 1990. Final report December 1992.

TELEMARK COLLEGE OF EDUCATION
CENTER FOR PEDAGOGICAL RESEARCH AND DEVELOPMENT

Title of project: DISTANCE EDUCATION IN MATHEMATICS BASED ON ELECTRONIC MAIL AND COMPUTER CONFERENCING

Person to contact: Dr. Gard Brekke
Senior Lecturer
Telemark College of Education
N-3670 Notodden
Norway

Duration: From January 1991 to September 1992

Funding:
- Ministry of Education and Research
- Section for Continued Training of Teachers

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In in-service teacher training in primary and lower secondary education (the schools which will take part in the project have not yet been selected):

- To develop, establish and evaluate an in-service course in mathematics for teachers;

Through the use of distance learning, to gain optimal benefit from grants for in-service training for teachers (due to a scattered population and long distances, this is expensive in Norway).

- To help augment the number of qualified mathematics teachers in primary and secondary schools in Norway. (About 50 per cent of the teachers actually teaching mathematics in lower secondary schools in Norway lack formal education in the subject);
- To contribute to teachers' awareness of the educational potential of computer communication.

Implementation:

One of the important aspects of distance education based on electronic mail and computer conferencing is the possibility to create a social environment for learning (a so-called "virtual classroom"). Close co-operation with school teachers is necessary to develop and evaluate this component of the in-service course.

The course will be equivalent to a half-year's fulltime study. A special group is established for each project, to ensure close co-operation between researchers, teachers and schools.

Products:

Computer conferences to be used for counselling and exchange of teaching ideas among mathematics teachers in schools (e.g. among teachers having completed the in-service training course).

Final report December 1992.

UNIVERSITY OF TRONDHEIM
DEPARTMENT OF COMPUTING SCIENCE

Title of project:	**DISTANCE LEARNING WITH WINIX**
Person to contact:	Bodil Ask University of Trondheim 7055 Dragvoll, Norway Tel. 07-59 1844
Duration:	From September 1990 to 1992
Funding:	– Ministry of Research and Education – University of Trondheim (equipment)
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In five upper secondary schools:

- To enable teachers who will be using computer software for distance learning to gain experience with the Winix concept (communication system);
- To develop and use software for distance learning;
- To evaluate the learning effects of the system.

Implementation:

The five schools are already connected to the network SIRNETT (Schools in a Regional Network).

Teachers will be offered a course in computer science, arranged as distance learning/in-service training. They will be given the opportunity of gaining a university degree to be studied at distance.

On the University side, researchers will be able to: gain experience in using the Winix system; implement software and have experience of interactive communication with distant students.

An evaluation of the achievements of distant students compared with ordinary students at the University will follow.

Regular meetings will take place using the Winix net "channel".

Products:

Final report 1992/1993.

Portugal

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THE MINERVA PROJECT

The MINERVA Project started on an experimental basis in 1985/86. Since 1989/90 it has become the National Project for the introduction, promotion and development of New Information Technology (NIT) in Portuguese Primary and Secondary Education.

Its aims are:

- To provide schools with IT equipment;
- To educate teachers and teacher trainers;
- To develop educational software;
- To promote educational IT research in Primary and Secondary schools;
- To highlight educational IT research as a means of changing teachers' roles in the teaching/learning process and making schools a wide-open universe;
- To develop IT use towards active life.

MINERVA is supported by the Portuguese Ministry of Education under the responsibility of a National Co-ordination Committee run at the Planning and Research Bureau (GEP).

The Project operates at several nodes run by Universities and Higher Schools of Education networking the schools of different levels all around the country in co-operation with the Regional Education Bureaux aiming to create a gradual and controlled expansion network.

These nodes are autonomous as to the definition of programmes, development and research.

Each node team trainers involve university teachers and teachers of primary and secondary education.

The following Projects are examples of activities undertaken by some nodes.

UNIVERSITE D'AVEIRO
CENTRE INTÉGRÉ DE FORMATION DES ENSEIGNANTS

Titre du projet: PROJET MINERVA - POLE DE L'UNIVERSITÉ D'AVEIRO

Personne à contacter: Professeur A. J. Ferrer Correia
Projecto MINERA, CIFPUA
Université d'Aveiro
3800 Aveiro, Portugal

Durée: En cours depuis 1985

Financement: Ministère de l'Education

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Pour 52 établissements scolaires du district d'Aveiro impliqués dans le Projet (18 écoles primaires, 14 écoles secondaires, 20 écoles supérieures, 2 écoles d'enseignement spécial et 1 école d'enseignement particulier) :

- Former les enseignants aux nouvelles technologies de l'information ;
- Soutenir les écoles intégrées dans le Projet ;
- Acquérir des logiciels, didacticiels et autres matériaux ;
- Favoriser les installations de travail avec des moyens convenables ;
- Produire et évaluer des didacticiels ;
- Créer des groupes de recherche dans des domaines spécifiques.

Mise en oeuvre:

Les disciplines scolaires pour les écoles secondaires et supérieures concernées sont les langues, les mathématiques, la biologie, l'histoire, l'enseignement technique et la physique.

Produits:

Rapport en 1992.

HIGHER SCHOOL OF EDUCATION OF BEJA
DEPARTMENT OF NEW INFORMATION TECHNOLOGIES

Title of Project:	**PROJECT MINERVA - NODE OF THE HIGHER SCHOOL OF EDUCATION OF BEJA**
Person to contact:	Prof. Rui Joae Baptista Soares Escola Superior de Educaçao Beja, Portugal
Duration:	Ongoing since 1989
Funding:	Ministry of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In twenty-one schools, primary, lower and upper secondary:

- To investigate the use of the computer as a working tool in education for both teachers and students.

Implementation:

The project explores a basic range of applications which include word processing, drawing, graphics, database, spreadsheets and programming languages (LOGO, BASIC). The implications of the use of software are taken into acount in areas such as concept development and interdisciplinary projects.

An inquiry was carried out to investigate teachers' attitudes towards the use of computers.

Products:

Final report July 1993.

UNIVERSITY OF COIMBRA
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES

Title of project:	**PROJET MINERVA - UNIVERSITY OF COIMBRA NODE**
Person to contact:	Dr. Teresa Mendes Computer Science and Systems Unit Department of Electrical and Computer Engineering University of Coimbra 3000 Coimbra, Portugal
Duration:	Ongoing since October 1985
Funding:	– Ministry of Education – National Institute of Scientific Research – Some European Programmes
Associated Universities:	Universities of Aveiro, Lisboa, Minho, and Porto.

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In 68 schools, at all levels of education, in the District of Coimbra:

- To introduce information technologies in educational practice and in the school curricula;
- To train teachers and teacher trainers for this change.

Implementation:

Activities in schools comprise teacher training and the organisation and dynamisation of computer use by pupils. These activities are perfomed by teacher trainers who are allocated to the project on a full-time basis for periods of three to four years. Initially, these trainers follow a six months training programme at the University. They begin their activities in schools, but still remain working closely with the University group, either by collaborating in various research projects, some of them international, or by receiving complementary training on specific topics.

Another main interest of the University group, as a part of the MINERVA project, is the development of educational software to be used in schools. Teachers working with the group on a full-time basis contribute significantly to the specification and pedagogical design of new packages.

Products:

Final report October 1992

UNIVERSITY OF LISBON
FACULTY OF SCIENCES, DEPARTMENT OF EDUCATION

Title of Project:	**PROJECT MINERVA - NODE OF THE UNIVERSITY OF LISBON**
Person to contact:	Prof. Joao Pedro Mendes da Ponte University of Lisbon Faculty of Sciences Av. 24 de Julho 134-4 1300 Lisbon, Portugal.
Duration:	Ongoing since October 1985
Funding:	Ministry of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In thirty-seven schools, in and outside Lisbon, six primary, eight upper primary, two lower secondary, and twenty-one upper secondary:

- To explore the use of the computer as a working tool to be used by students in their projects and learning activities.

Implementation:

The main lines of work concern the use of computers: as support for cross-subject projects, regarding the development of skills to deal with large amounts of information and critical thinking; in specific subjects, specially mathematics, science, hisory, geography and social sciences, and languages; in training teachers to use computers in education, and training of school co-ordinators and supervisors; in development of innovative projects, such as the establishment of telematic links between schools; in production of support materials.

Research undertaken concerns: the implications of word processing in native and foreign language learning; working environments in primary school using LOGO; use of LOGO programming activities and microworlds, and student' attitudes, and concepts in mathematics; use of spreadsheets in problem solving ability and in concept development in mathematics; use of computers with very low achieving students; a resource for interdisciplinary projects and activities; teachers' attitudes to computers.

Products:

Final report July 1993

HIGHER SCHOOL OF EDUCATION OF LISBON

Title of Project:	**PROJECT MINERVA - NODE OF THE HIGHER SCHOOL OF EDUCATION OF LISBON**
Person to contact:	Prof. Maria Cecilia Soares de Morais Monteiro Escola Superior de Educaçao de Lisboa Rua Carolina Michaelis de Vasconcelos 1500 Lisbon, Portugal
Duration:	Ongoing since 1986
Funding:	Ministry of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In forty-seven schools in Lisbon (pre-primary, primary and lower secondary):

- To develop the use of computers in interdisciplinary projects, both curricular and extracurricular;
- To study the introduction of computers in specific curriculum areas, developing materials and investigating innovative ways of learning in mathematics, biology, foreign languages, Portuguese, history and social studies, and music;
- To implement a teacher training programme for the above, with particular emphasis on teacher attitudes towards learning.

Implementation:

The teacher training component involves technical/pedagogical seminars, as follows: short initial technical training; training in more detail for projects which teachers will develop in their schools with students; the links between pedagogical and technical training; annual joint presentation of the work of the schools; direct support in the school by teacher trainers.

The courses are followed by evaluation and sharing of experiences between participants.

Products:

Final report 1993.

UNIVERSITE DE MINHO

Titre du projet : **PROJET MINERVA - POLE DE L'UNIVERSITE DE MINHO**
Nouvelles Technologies dans l'Enseignement et l'Apprentissage des Langues

Personne à contacter : Professeur Altamiro Barbosa Machado
Université de Minho
Largo do Paço
4719 Braga Codex, Portugal
Tél: 53614248 / 53676376 - Fax: 53 77936

Durée : de mars 1987 à juillet 1992

Financement :
- Ministère de l'Education
- Ecoles associées au Projet
- Municipalités

Universités associées:
- Université de Paris-Nord, France
- Université de Toulouse, France
- Université de Porto, Portugal
- College of St. Mark & St. John, Royaume Uni.

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans dix écoles (4 pré-primaires, 2 secondaires inférieures et 4 secondaires supérieures):

- Utiliser les nouvelles technologies dans l'apprentissage des langues, à travers une stratégie proche de la recherche-action, pour étudier leurs influences dans le développement intellectuel et social des élèves ainsi que dans les interactions observées entre les classes et au sein même de ces classes.

Mise en oeuvre :

Le projet global intègre différentes actions dont les objectifs sont :

- d'établir et de renforcer des contacts, nationaux ou internationaux, avec des universités et autres institutions ;
- d'élaborer, d'évaluer et de diffuser la documentation disponible dans le domaine du projet ;
- de promouvoir des rencontres de dimension locale, nationale et internationale afin de débattre des questions liées à ce champ de travail.

Les activités en 1990-1991 concernent : Nouvelles Technologies, Langue maternelle et Développement cognitif ; MOSAIQUE : Perspective holistique aux niveaux des premiers contacts avec la langue maternelle ; Enseignement/apprentissage du français - langue étrangère ; INFOR-HELP : pour apprendre l'anglais et faciliter l'utilisation de l'informatique.

Produits :

Rapport final attendu pour octobre 1992.

UNIVERSITE DE MINHO

Titre du projet : **PROJET MINERVA: POLE DE L'UNIVERSITE DE MINHO**
Développement de Centres locaux de Formation et de Ressources (C.A.L)

Personne à contacter : Professeur Altamiro Barbosa Machado
Université de Minho
Largo do Paço
4719 Braga Codex, Portugal
Tél: 53 614248 - Fax: 53 77936

Durée : De 1988 à 1992

Financement :
- Ministère de l'Education,
- Direction Générale de l'Enseignement Primaire et Secondaire, Lisbonne
- Programme de Développement Educatif (PRODEP)
- Associations Commerciales et Industrielles locales,
- Autorités Administratives locales.

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans 108 écoles (1 maternelle, 52 primaires, 29 secondaires inférieurs, 24 secondaires supérieur et deux écoles pour handicapés):

- Etablir des Centres de Ressources soutenant le processus d'introduction des NTIC comme appui au processus éducatif au niveau de l'enseignement élémentaire et secondaire.

Mise en oeuvre :

Les Centres de Ressources de chaque école sont coordonnés dans les Centres de Formation et de Ressources régionaux dont les objectifs sont :

- Le lancement des infrastructures régionales et locales ainsi qu'un réseau de communication locale (télématique) ;
- La formation des équipes de supervision à l'échelon régional et au niveau des écoles ;
- Le développement des projets de "recherche-action" pédagogiques qui groupent des professeurs et des chercheurs des institutions universitaires avec des enseignants et des techniciens de l'enseignement non supérieur de tous les niveaux et de toutes les spécialités.

Produits :

L'Université de Minho coordonne les Centres de Formation et de Ressources régionaux

UNIVERSITE DE MINHO

Titre du projet : PROJET MINERVA: POLE DE L'UNIVERSITE DE MINHO
Nouvelles Technologies dans les Domaines de la Composition et de l'Interprétation Musicales

Personne à contacter : Professeur Altamiro Barbosa Machado
Université de Minho
Largo do Paço
4719 Braga Codex, Portugal
Tel: 53 614248 - Fax: 53 77936

Durée : De 1990 à 1992

Financement :
- Ministère de L'Education
- Programme de Développement Educatif, Lisbonne
- Fondation Goue benkian

Universités associées :
- Université de Coimbra
- Université de Reading, Royaume-Uni
- Ecole Supérieure d'Enseignement de Lisbonne

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans six écoles de niveau secondaire inférieur :

- Contribuer à la transformation de l'enseignement musical pour l'avenir ;
- Etudier l'importance de l'utilisation des nouvelles technologies dans le développement auditif et dans l'attitude des enfants face à l'improvisation, composition et interprétation musicales ;
- Analyser l'influence des nouvelles technologies sur les élèves et sur les professeurs ;
- Développer du matériel pédagogique qui puisse être publié et soutenir des projets d'utilisation des nouvelles technologies dans l'enseignement de la musique.

Mise en oeuvre :

Les Centres de Ressources de Lisbonne, Braga et Coimbra ont pour rôle de former techniquement et pédagogiquement les professeurs qui participent au projet. Chaque noyau scolaire engage au moins deux professeurs.

Produits :

Rapport en 1992.

UNIVERSITE DE MINHO

Titre du projet: PROJET MINERVA: POLE DE L'UNIVERSITE DE MINHO
Soutien au Développement de Projets Educatifs

Personne à contacter: Professeur Altamiro Barbosa Machado
Université de Minho
Largo do Paço
4719 Braga codex, Portugal
Tél: 53614248 / 53676376 - Fax: 53 77936

Durée: En cours

Financement:
- Ministère de l'Education
- PRODEP : Programme de Développement Educatif, Lisbonne
- Associations Commerciales et Industrielles Locales
- Autorités Administratives Locales

Universités associées: Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

- Soutenir le développement de projets éducatifs qui utilisent l'informatique.

Dans 54 écoles (20 pré-primaires, 11 primaires, 4 secondaires inférieures, 14 secondaires supérieures, 3 techniques et 2 d'enseignement spécial):

Mise en oeuvre:

Il a été créé une structure afin d'aider les professeurs des écoles qui présentent des projets ayant pour but :

- L'indentification, l'organisation et l'évaluation de chaque travail ;
- Les contacts avec d'autres écoles et d'autres projets de travail ;
- L'efficacité de l'administration et de la gestion du projet.

Outre le fait de conseiller dans le choix et l'installation de l'équipement, on met en oeuvre, dans le domaine de l'utilisation des moyens informatiques, un programme de formation et d'accompagnement pédagogique des expériences.

Ce projet de coopération avec plusieurs écoles est lié directement au Programme Portugais de Développement Educatif (PRODEP).

Produits:

Rapport en 1992.

UNIVERSITE DE MINHO

Titre du projet : PROJET MINERVA : POLE DE L'UNIVERSITE DE MINHO
Development du Parc National Peneda-Gérès National

Personne à contacter :
Professeur Altamiro Barbosa Machado
Université de Minho
Pojecto Minerva
Largo do Paço
4719 Braga Codex, Potugal
Tél: 53 614248 - Fax: 53 77936

Durée : En cours depuis 1987

Financement :
- Université de Minho
- Parc National Penada-Gérès
- Programme de Développement Educatif, Lisbonne

Universités associées : Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Dans 21 écoles primaires du Parc national Penada-Gérès :

- Promouvoir le développement intégré du Parc en agissant sur la composante éducative par l'installation d'un réseau électronique reliant toutes les écoles.

Mise en oeuvre :

Le Parc National Penada-Gérès a été créé en 1971 au Nord du Portugal, sur une superficie de 70 000 hectares. Sa population est de 12 000 habitants répartis dans 114 villages. Un des principaux problèmes du Parc est le taux élevé d'échec scolaire des 1 050 élèves situés dans les 51 écoles.

Chacune des 21 écoles du Projet dispose de matériels vidéo, d'un ordinateur et d'une imprimante par salle de classe et d'un modem, leur permettant de communiquer ensemble au travers d'un réseau électronique.

La coordination globale du Projet est assurée par l'Université de Minho. Une attention particulière est portée à l'évaluation du Projet aux niveaux national et international avec l'Université de Norwich, Royaume-Uni, et l'Université de Valence, Espagne.

Des réunions périodiques (2 par mois) sont organisées entre l'Université et les enseignants affectés au Projet.

Produits :

- Rapport au terme de chaque année scolaire ;
- Rapport final en 1993.

UNIVERSITE DE PORTO

Titre du projet:	**PROJET MINERVA - POLE DE L'UNIVERSITE DE PORTO**
Personne à contacter:	Professeur Duarte Costa Pereira Université de Porto Rua de Ceuta, n°118 - 6° Sala 44 4000 Porto, Portugal
Durée:	En cours depuis 1985
Financement:	Ministère de l'Education
Universités associées:	Université d'Aveiro

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Pour 18 écoles secondaires et techniques du district de Porto impliquées dans le Projet :

- Former les enseignants stagiaires à la connaissance des matériels et des logiciels - type traitement de textes, tableurs et base de données - et surtout aux utilisations pédagogiques de l'ordinateur ;
- Assurer une formation en cours de service aux enseignants de dix Centres scolaires d'informatique (CEI).

Mise en oeuvre:

Les disciplines scolaires concernées sont le portugais, les langues, les sciences et les techniques. Une fois terminée leur formation initiale, les nouveaux enseignants peuvent continuer leur travail dans les centres scolaires d'informatique de leurs écoles.

Les enseignants en formation en cours de service ont, quant à eux, la responsabilité : de sensibiliser et de dynamiser leurs écoles ; de susciter la présentation de projets pédagogiques ; d'aider les autres enseignants à utiliser les différents types de logiciels ; d'entreprendre l'évaluation du travail développé ; d'aider et d'encourager les enseignants des CEI dans la concrétisation des activités des écoles.

Le projet développe aussi des recherches dans le cadre du département de psychologie de l'Université. Le projet a aussi une équipe qui s'occupe de l'enseignement spécial.

Pour faciliter la mise en oeuvre des activités du Pôle de Porto, un Département a été specialement créé au sein de l'Université.

Produits:

Rapport final prévu pour 1992.

Spain

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UNIVERSITY OF MADRID
SCHOOL OF EDUCATION

Title of project:	**APPLICATION OF NEW TECHNOLOGIES IN TEACHING SCIENCE (ANTEC)**
Person to contact:	Prof. J. Cervello Collazos Department of Teaching Science Universidatd Computense de Madrid EUFP "Maria Diaz Jiménez", Av. Filipinas, 3 28003 Madrid, Spain Tel. 91 5339557 – Fax: 91 5345155
Duration:	From October 1989 to September 1992
Funding:	– Regional Education Authorities – PNTIC (New Information and Communication Technologies Programme)
Associated Universities:	University of Valladolid, School of Education

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one pre-primary and primary, one lower and upper secondary and one vocational school:

- To undertake research on the way computers and video are used in the classroom in order to improve the way teachers use these technologies;
- To design and to experiment with a model of teacher training to be introduced in the Teacher Training College, in specific topics from physical and earth sciences.

Implementation:

All schools in the project had been previously equipped by the PNTIC with a microcomputer classroom, or a video classroom, or both.. The professors from the University act basically as facilitators, their main activity being concerned with promoting the learning capacities of teachers. A teacher, devoted full time to the project, acts as a continuous link between professors and teachers, supporting the teachers "in situ". The project, using an action research methodolgy, tries to develop in the teachers a sense of self-commitment which allows them to reflect on their work in the classroom and promote their pupils' learning capacities.

This project is closely linked to the PNTIC which covers the twenty eight Spanish provinces under the authority of the Ministry of Education and Science.

Products:

During academic year 1989-90, the teachers co-authored a paper presented at a National Meeting of Science Learning.

Two experimental courses in chemistry and earth sciences using computers and video started in 1991 for teacher trainees.

UNIVERSITE DE SAINT-JACQUES-DE-COMPOSTELLE
INSTITUT DES SCIENCES DE L'EDUCATION

Titre du projet :	**PROJET TELEGAL (PHASE 1)** **PROJET ABRENTE (PHASE 2)**
Personne à contacter :	Dr. Jose A. Cajaraville Pegito Université de Saint-Jacques-de-Compostelle Département de Didactique des Sciences Experimentales E.U del profesorado de EGB Avda Juan XXIII, s/n ' 15704 Santiago de Compostela, Espagne Tel. 981/583458
Durée :	*Phase 1 :* 1981-1985 – *Phase 2 :* depuis 1985
Financement :	**Phase 1.** Fondations Barrié et FUNDESCO **Phase 2.** Conseil de l'Education - XUNTA de Galice et l'Université de Saint-Jacques.
Universités associées :	Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

Former des enseignants en cours de service à l'informatique éducative dans 20 écoles de l'enseignement pré-primaire, primaire et du premier cycle de l'enseignement secondaire, chacune équipée de 10 PC-XT compatibles.

Mise en oeuvre :

Dans la première Phase, les cours ont porté essentiellement sur l'initiation informatique, la programmation en BASIC, la conception en BASIC de programmes d'exercices répétitifs et l'introduction à LOGO.

Dans la seconde Phase, les enseignants ont été formés aux traitements de textes, aux tableurs, aux bases de données, à une connaissance plus approfondie de LOGO et à l'utilisation de logiciels pédagogiques existant sur le marché.

Produits :

180 enseignants responsables de 3500 élèves sont concernés par le Projet. De plus, le succès de la Phase 1, expérimentale et subventionnée par des Fondations privées, a conduit le Gouvernement Autonome de Galice à prendre en charge institutionnellement et financièrement la Phase 2 au travers de son Conseil pour l'enseignement et l'organisation universitaire.

UNIVERSITY OF VALLADOLID
SCHOOL OF EDUCATION

Title of project:	**APPLICATION OF NEW TECHNOLOGIES IN TEACHING SCIENCE (ANTEC)**
Person to contact:	Dr. Maria J. Saez Brezmes University of Valladolid Cell Biology Department C/Geologo Hernandez Pacheo S/N - CD 47014 Valladolid, Spain
Duration:	From October 1989 to September 1992
Funding:	PNTIC (New Information and Communication Technologies Programme)
Associated Universities:	University of Madrid, School of Education, Department of Teaching Science

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one lower secondary, three upper secondary and two vocational schools in Valladolid:

- To establish a collaborative project with the University departments, to develop a relevant action-research model to analyse the impact of the introduction of new information technologies on the science curriculum and on teaching/learning processes in the classrooms.
- To design and implement an initial training model in the area of science in the School of Education using NIT educational potential and a science, technology and society integrated approach.

Implementation:

In this action-research model, teachers investigate the teaching/learning process in their classrooms. University researchers provide support to teachers and study specific questions about learning science with NIT and more generally examine the problems raised by the introduction of NIT in the classrooms.

This project is closely linked to the PNTIC which covers the twenty eight Spanish provinces under the authority of the Ministry of Education and Science.

Products:

Final report October 1992

Sweden

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UNIVERSITY OF FALUN/BORLANGE

Title of project: "FRAMTIDSBARN" CHILDREN IN THE FUTURE

Person to contact: Tommy Isaksson
Lecturer
University of Falun/Borlange
Box 2004
S-79102 Falun, Sweden
Tel: 46 23 819 00 - Fax: 46 23 819 71

Duration: From 1990 to 1993

Funding:
- National Board of Health and Welfare
- University of Falun/Borlange
- Nine municipalities in Sweden

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In Childrens' Leisure Centres in Sweden, some of which co-operate with primary schools:

- To introduce children to the use of new information technologies.

Implementation:

Children' Leisure Centres have been equipped with computers and modem and through an electronic network, twelve childrens' groups all over Sweden, transmit letters and documents and produce a newspaper together, build databases, and so on. They also used telecommunication to work with childrens' groups in Denmark and the United Kingdom.

Products:

Final report 1993.

UNIVERSITY OF FALUN/BORLANGE

Title of project: PROJECT TO LINK UNIVERSITIES AND TEACHING ORGANISATIONS (PLUTO)

Person to contact: Tommy Isaksson
Lecturer
University College of Falun-Borlange
Box 2004
S-791 02 Falun, Sweden
Tel. 46 23 81900 – Fax: 46 23 81971

Duration: From September 1987 to 1994

Funding:
- University of Falun/Borlange
- COMETT II (Commission of the European Communitie Project)

BRIEF DESCRIPTION OF THE PROJECT

PLUTO is a European education, industry and government project, the aim of which is to raise the level of information technology literacy and language skills in teacher training, schools and industry through practical networking. Manchester Polytechnic is the organiser of the Project, which links the the University of Vienna, Austria, the Free University of Brussels, Belgium, the University of Oldenburg, Germany, the University of Patras, Greece, and the University of Falun-Borlange, Sweden.

Aims:

In two childrens' leisure centres (7-12 years):

- To enhance new information technology training in Europe via co-operation based on the use of the electronic network EARN (European Academic and Research Network).

Implementation:

The skills covered range from those in which some expertise exists already but where there is need for enhancement (e.g. database and spreadsheet up to the level of structured Query language) to areas in which the experience base is virtually nil (use of hypermedia). The project will involve the preparation of support for training in all of these areas, while additionally developing the use of networking as a modality for collaboration.

Products:

Published training strategies; support materials, including manuals and videos (minimum of five); identification and dissemination of specifications for further development, based on analysis of user and group needs; electronic publication of a Newsletter to disseminate information about project development; paper publication of a series of reports on project achievements.

Final report 1992.

UNIVERSITY OF KARLSTAD

Title of project: NORDEN' 90

Person to contact:
Alvar Löfskog
University of Karlstad
Box 9501
S-65009, Karlstad, Sweden
Tel: (054) 83 00 20

Duration: From 1988 to August 1991

Funding:
- Nordic Council of Ministers
- Departments of Education in each of the five Nordic countries

Associated Universities:
- University of Jyvaskyla, Finland
- Stord College of Education, Norway

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In lower secondary education:

- To present a subjective view of the daily life in the Nordic countries through the use of interactive media in social science.

Implementation:

The members of the production group of the project have competence in communication (image, film, sound), pedagogy, social science and informatics. There is a production group in each of the five countries, conducted by a national project manager. The Educational Software Group of the Nordic Council of Ministers is closely associated to the Project as well as the Departments of Education of the countries.

The schools will take part mainly in the prototype test and evaluation phase and have therefore not yet become part of the project.

Products:

Final report August 1991.

UNIVERSITY OF LULEA
SCHOOL OF EDUCATION

Title of project:	**THE COMPUTER AS AN EVERYDAY TOOL FOR TEACHING AND LEARNING**
Person to contact:	Prof. Anders Söderlund School of Education Research Department University of Lulea S - 951 87 Lulea, Sweden
Duration:	From January 1990 to December 1992
Funding:	Northern Region Research Council
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one primary, one lower and one upper secondary school:

- To develop the use of computers as an every day tool for teaching and learning.

Implementation:

The project examines how the new storage technology, methods of communication with and between computers, as well as enhanced graphics and new tools for the development of software, can be developed and used in the complex process of teaching.

Experienced teachers work to facilitate the opening up of new possibilities for teaching and learning, where CD-ROM, CD-Video and sound are integrated into multi media products. User-friendly products in this area are being developed, with appropriate methodology for the use of computers in the school. The computer will be placed so that it is more easily available to pupils and teachers in order to become an "every-day tool".

In the long run, the project hopes to establish a way to turn the computer, as part of a multi media environment, into a tool that will help to transform classroom culture in order to encourage active intellectual pursuit over rote memorisation, and collaboration over competition.

Products:

Final report 1993.

UNIVERSITY OF UMEA
DEPARTMENT OF TEACHER TRAINING
DEPARTMENT OF IN-SERVICE TRAINING

Title of project: **SkolSNIC (SNIC: Center for Information Technology in Northern Sweden)**

Person to contact: Dr. Jan-Olof Lindström
SkolSNIC, LHS
University of Umea
S-901 87 Umea, Sweden

Tel. 46 90 165000 – Fax: 46 90 166671

Duration: From November 1988 to June 1991

Funding:
- The Department of Education, Stockholm
- Umea University
- DEMOTEL of the Telephone Company of Sweden
- Six hardware suppliers and software vendors.

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two primary, three lower and three upper secondary and two vocational schools:

- To identify and organise locally available competent and experienced teacher consultants in the use of the computer as a teaching aid; to support the in-service and pre-service training of teachers in this area;
- To initiate and implement school projects; to evaluate the potential use of computers and to provide information and advice about research and development in this field;
- To provide resources for development of educational software.

Implementation:

An informal group was constituted as a board with responsibility for running the project. Two teachers in each specific subject area were invited to join the project to train as consultants. A resource center including a computer laboratory and smaller rooms for project work was set up at the University, to keep both material and competency continuously updated. SNIC, a joint non-profit organisation for supporting the use of information technology in the region, represents the University, the County Administration Board and the County Councils and Municipals Councils of the region.

During the last year, the project offered around forty days of seminars and courses as in-service training for teachers at all levels of the educational system (e.g. Prolog and Mathematica, the Computer in process writing and applications in primary schools).

SkolSNIC has also the responsibility to run the national electronic conference SkolKOM.

Products:

The complete projects are sold by the Centre to schools all over the country on a non-profit basis. Final report May 1991.

UNIVERSITY OF UPPSALA
COMPUTING SCIENCE DEPARTMENT

Title of project: PROLOG-O: A PROGRAMMING ENVIRONMENT FOR CHILDREN

Person to contact: Kristina Hook Jansson
University of Uppsala
Computing Science Department
PO Box 520
S-751 20 Uppsala, Sweden
Tel: 46 18 18 25 00

Duration: From 1986 to 1988

Funding: National Board of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In one primary school (intermediate level):

- To introduce the PROLOG programming language.

Implementation:

All school subjects were covered by the project. The children made animated films by making simple computer programs.

Most practical work was carried out by undergraduate students under the supervision of a university teacher/researcher. Project meetings took place, alternating between the University and the National Board of Education.

The project was initiated by the National Board of Education, which is an educational policy-making body.

The Department hosted the PROLOG Education Group (PEG89) Conference in Uppsala in June 1989.

Products:

Report at 3rd International Conference on "AI and Education", Pittsburgh, PA, 1987 and at Apple's 3rd International Symposium, Pisa, Italy, 1987.

UNIVERSITY OF UPPSALA
DEPARTMENT OF TEACHER TRAINING

Title of project: ANALYSIS OF THE CONSEQUENCES OF COMPUTERS FOR MATHEMATICS EDUCATION (ADM-PROJECT)

Person to contact: Dr. Hans Brolin
Department of Teacher Training
University of Uppsala
Box 2136
750 02 Uppsala, Sweden
Tel. 46 18 18 25 00

Duration: From July 1986 to June 1990

Funding:
- University of Uppsala
- Ministry of Education
- National Board of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In 50 upper secondary schools all over the country:

- To study the role of the computer in mathematics education and, in particular, to analyse the contribution of toolkit programs to changes in traditional teaching methods (i.e. how computers can be utilised to contribute towards a) an improved understanding of concepts and relationships and b) better problem-solving ability);
- To provide students before leaving school with the opportunity to discover and learn the use of the powerful computing devices available today in mathematics.

Implementation:

The experience gained in the project has concluded that mathematical toolkits enable the study of problems of great complexity by executing routine calculation and allowing the students to understand concepts.

The project has initiated experimental teaching in different sub-projects studying advanced program software in classroom situations and determining what modifications this software might bring about in the teaching of mathematics: study of functions; differential equations; analysis of data; mathematics and logic using Prolog. This enables students to develop the ability to: apply their mathematics in new situations (formulate and solve problems); discuss mathematical problems; carry out a mathematical argument and critically evaluate results.

Products:

Final report October 1990. The results of this project have been used in the National three-year Project Computers in Education, started in 1988.

UNIVERSITY OF UPPSALA
COMPUTING SCIENCE DEPARTMENT

Title of project: FIVE KBS APPLICATIONS

Person to contact: Anneli Edman
University of Uppsala
Computing Science Department
PO Box 520
S-751 20 Uppsala, Sweden
Tel: 46 18 18 25 00

Duration: From October 1988 to October 1990

Funding: National Board of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In upper secondary education:

- To analyse KBS applications.

Implementation:

Two of five planned KBS applications are under way:

- A knowledge-based system for problem solving in mathematics;
- A criticising system for a problem area in social science that is considered difficult to formalise, viz. the right to asylum for political refugees. Most practical work was carried out by undergraduate students under the supervision of a university teacher/researcher. Project meetings took place, alternating between the University and the National Board of Education.

The project was initiated by the National Board of Education, which is an educational policy-making body.

Products:

Presented at the PEG89 (PROLOG Education Group) Conference in Uppsala, hosted by the Department.

UNIVERSITY OF UPPSALA
DEPARTMENT OF TEACHER TRAINING

Title of project: THE ROUND BOOK - THE TEXTBOOK OF THE FUTURE

Person to contact: Arne Lindquist
Lecturer
Interactive Media Group
Department of Teacher Training
University of Uppsala
Box 2136
S-750 02 Uppsala, Sweden
Tel: 46 18 18 24 65 – Fax: 46 18 18 24 00

Duration: From July 1987 to July 1991

Funding:
- University of Uppsala
- Central Board of Higher Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four schools, lower and upper secondary, in social sciences:

- To develop databases on CD-ROM with text and numerical information of interest for teachers and students.

Implementation:

The databases contain the following:

- The Swedish Parliament Private Bills and Proceedings in full text;
- The programs of the Swedish political parties in full text;
- The Third World Guide of the World in full text;
- A student career database;
- Statistical databases including a graphical user-interface and a mapping program, containing numerical data of the Swedish and the Nordic communes, the countries of the world, etc.

Only text databases on CD-ROM are being produced, but interactive databases with pictures and sound are planned.

There is a Nordic reference group with representatives for Norway, Sweden, Finland, Iceland and Denmark, meeting approximately two or three times a year.

Products:

Approximatly 100 schools are testing the databases (without being directly involved in the project).

Final report July 1991.

UNIVERSITY OF UPPSALA
COMPUTING SCIENCE DEPARTMENT

Title of project:	**ANALYZE MORE: AN EXPERT SYSTEM FOR ENVIRONMENT PROTECTION**
Person to contact:	Anneli Edman University of Uppsala Computing Science Department PO Box 520 S-751 20 Uppsala, Sweden Tel: 46 18 18 25 00
Duration:	Ongoing from summer 1990.
Funding:	National Board of Education
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In upper secondary school:

- To introduce the use of new information technologies in schools, and in particular, to design an expert system for environmental education.

Implementation:

Analyse More is a computer expert-system created at the University as a support for students in sampling and evaluating the quality of water in lakes. It covers several school subjects: geography, physics, chemistry and biology, and builds on expert knowledge from the National Swedish Environment Protection Board.

Both experts and teachers contribute with testing methods.

Most practical work was carried out by undergraduate students under the supervision of a university teacher/researcher. Project meetings took place, alternating between the University and the National Board of Education.

The project was initiated by the National Board of Education, which is an educational policy-making body.

Products:

The project is still at the planning stage. No schools have yet been involved.

Switzerland

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UNIVERSITY OF BERNE
INSTITUTE OF EDUCATIONAL PSYCHOLOGY AND DIDACTICS

Title of project:	THE CLASSROOM USE OF AN INTELLIGENT TUTORING SYSTEM IN MATHEMATICS
Person to contact:	Dr. Kurt Reusser Institute of Educational Psychology and Didactics University of Berne Muesmattstrasse 27 P.O. Box CH-3000 Berne 9, Switzerland
Duration:	From April 1989 to April 1992
Funding:	– Swiss National Science Foundation – University of Berne
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In several schools, primary and lower secondary located near Berne:

- To gather data about the use in mathematics of an Intelligent Tutoring System in a clasroom setting;
- To carry out an efficiency and sufficiency test of the computer tutor.

Implementation:

An Intelligent Tutoring System (HERON), based on didactical and educational theories and work on cognitive simulation, helps students to solve relatively complex mathematical problems. More specifically, it is designed to aid children in analysing natural language problem texts and in building mathematical problem models. This is done by means of several kinds of didactic strategies and representational formats. HERON can be seen as a fancy black-board for text comprehension and mathematisation with directly manipulable objects. It maximises the student's sense of control and the degree to which solutions are self-generated.

The project examines both the efficiency of the program and its social-cognitive and didactical implementation in normal classrooms.

Products:

The computer tutor will be provided for the teachers in a number of classes (which do not participate in the intervention study) for about half a year.

Final report May 1992.

UNIVERSITE DE FRIBOURG
INSTITUT DE PSYCHOLOGIE ET DE PEDAGOGIE

Titre du projet: **L'INTEGRATION DE L'INFORMATIQUE A LA PRATIQUE PEDAGOGIQUE - POUR UNE APPROCHE TRANSDISCIPLINAIRE**

Personne à contacter : Professeur Bruno Vitale
Université de Fribourg
CH-1701 Fribourg
Suisse

Tel: (022) 782 50 18

Durée : Début du projet : 1988

Financement :
- Centre de Recherches psychopédagogiques,
- Département de l'Instruction publique, Genève,

Universités associées :
- Université de Genève (Laboratoire de Didactique et d'Epistémologie des Sciences), Suisse, et
- Université de Naples (Institut de Physique théorique), Italie

DESCRIPTION SOMMAIRE DU PROJET

Objectifs:

Dans deux classes pilotes de 8ème (1er cycle du secondaire), déjà initiées en 7ème à l'informatique (LOGOwriter), on explore, avec les deux enseignants, le développement des concepts de changement et de croissance dans des domaines très différents (poids et taille des élèves, changement de population dans une ville, culture bactérielle ou micotique, etc.).

Mise en oeuvre:

L'activité pédagogique présente plusieurs phases : récolte de données, description et représentation qualitative, construction d'un modèle local et programmation en LOGOwriter. Ensuite, le modèle local est perfectionné avec l'aide de l'ordinateur et les procédures informatiques utilisées sont discutées en commun.

Produits:

Une publication de B. Vitale : "L'intégration de l'informatique à la pratique pédagogique"; (vol. 1 : Considérations générales pour une approche transdisciplinaire) et (vol. 2 : Les Projets : Cahier I. Jeux ; Cahier II. Arbres et arborescences ; Cahier III. Croissance et changement – *en préparation*), CRPP-DIP, Genève 1990.

UNIVERSITE DE GENEVE
FACULTE DE PSYCHOLOGIE ET DES SCIENCES DE L'EDUCATION

Titre du projet :	**TECHNOLOGIES DE FORMATION ET APPRENTISSAGE (TEC FA)**
Personne à contacter :	Professeur Patrick Mendelsohn Université de Genève Faculté de Psychologie et des Sciences de l'Education 24, rue Général-Dufour CH - 1211 Genève 4 Tél. 41 (22) 781 1530 - Fax: 41 (22) 871 0350
Durée :	En cours depuis janvier 1990
Financement :	Université de Genève
Universités associées :	Néant

DESCRIPTION SOMMAIRE DU PROJET

Objectifs :

L'Université de Genève coopère étroitement avec le Centre d'Enseignement Assisté par Ordinateur du Département d'Instruction Publique de Genève. Ce Centre représente les différents niveaux d'enseignement : primaire, secondaire et technique. L'objectif des projets de coopération est la formation des enseignants aux utilisations pédagogiques de l'ordinateur.

Mise en oeuvre :

Une série de séminaires est proposée par l'Université et le Centre EAO concernant, par exemple, les environnements d'apprentissage, le rôle des traitements de textes, l'utilisation de l'informatique dans le rapport à l'écrit ("les techniques de la lecture savante comme condition des apprentissages de base"), la maîtrise de l'informatique en classe. L'Université apporte son concours dans les domaines de la psychologie cognitive, des sciences de l'éducation, de l'intelligence artificielle et des environnements d'apprentissage. Le Projet START-UP du Programme DELTA de la Commission des Communautés Européennes est également impliqué dans certaines activités.

Les dates des séminaires et la participation aux stages sont décidés au début de l'année académique.

Produits :

Le Projet est étroitement lié aux instances du département de l'Instruction Publique de Genève par le Service de Coordination Informatique

Turkey

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CUKUROVA UNIVERSITY
DEPARTMENT OF PHYSICS
DEPARTMENT OF EDUCATIONAL SCIENCES

Title of project: INTRODUCING INFORMATICS INTO SCHOOLS

Person to contact: Prof. Gülsen Onengüt
Cukurova University
Fen-Edebiyat Fakültesi
01330 Adana, Turkey

Tel: (90) (711) 45031-45 – Fax: 41945

Duration: From 01/09/90 to 30/06/92

Funding:
- The Universities
- UNESCO pilot project
- German Society for Joint Technical Projects (GTZ)
- Teleteknit (by providing computers at reduced rate)

Associated Universities:
- Istanbul Technical University (Department of Physics)
- Middle East Technical University (Department of Physics)
- Ege University (Department of Computer Engineering)

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To integrate microcomputer-aided learning methods at all levels of education. Microcomputer-based laboratories and general purpose programs like word processing, spreadsheets and databases are the main applications for educational purposes.

Implementation:

Four universities have joined forces to start a co-operative project with a private school covering pre-primary to upper secondary education levels. Under the guidance of the researchers from the university, the school has been equipped with a resource room containing 16 computers.

Interested teachers can use this room for presenting CAL material in their course and laboratory work. The researchers from the universities will act as advisors for all these activities. They will work with the teachers both at the university, trying to get them involved in the production of CAL materials, and at the school while they are using this material with the students.

Products:

Efficient teacher training for using Computer-Aided Learning.

MIDDLE EAST TECHNICAL UNIVERSITY
FACULTY OF EDUCATION

Title of project: COURSEWARE DEVELOPMENT AND TEACHER TRAINING

Person to contact: Prof. Dr. Hasan Güran
Middle East Technical University
Balgat
Ankara, 06531, Turkey

Tel: 223 71 000/3113-3114
223 84 91 – Fax: 9-4-223 84 91

Duration: From December 1988 to July 1989

Funding:
- The Scientific and Technical Research Council of Turkey
- The Ankara Electronic Research and Development Institute
- HEMA Electronic (by providing computers)

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

- To develop courseware packages based on the Turkish Curriculum and to train the selected teachers to write and design appropriate scenarios for the courseware.
- To train all teachers in the school in computer-assisted instruction.
- To obtain feedback about the courseware, its applications and teacher training.

Implementation:

The Ankara Anadolu Lycée (upper secondary education level) was chosen as a pilot institution to implement these aims. The subject matters concerned were Mathematics, Chemistry, Biology and Physics.

Products:

The project was carried out under the control of the Ministry of Education. Its results were therefore very important for education policy-makers.

United Kingdom

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THE QUEEN'S UNIVERSITY OF BELFAST
SCHOOL OF EDUCATION

Title of project:	**SUPER SHOPPER - A CONSUMER AWARENESS COMPUTER BASED LEARNING PACKAGE FOR PRIMARY SCHOOLS**
Person to contact:	Dr. John Gardner School of Education The Queen's University of Belfast 69 University St. Belfast BT7 1HL, Northern Ireland Tel. 44 232 245 133 – ext 7141 Fax. 247895
Duration:	From January to November 1989
Funding:	– General Consumer Council for Northern Ireland – The Queen's University of Belfast
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two primary schools:

- To find a computer-based means to present consumer issues to young primary school children;
- To promote economic awareness in pupils.

Implementation:

The project was initiated by the General Consumer Council. The University then identified the schools, teachers and pupils to be involved. A games approach was proposed and piloted with the schools involved. After a process of re-design and refinement, a prototype package was developed. This was piloted and, with modifications, was adopted.

The final package included paper-based and computer based materials centering on the hypothetical spending undertaken in a week in a pupils' life.

Meetings were held fortnightly with trialling in schools once a month.

Products:

A teaching package which was disseminated through the five education and library boards (local education authorities)

Final report November 1989.

THE QUEEN'S UNIVERSITY OF BELFAST
SCHOOL OF EDUCATION

Title of project:	**ECODISK - A CROSS-CURRICULAR APPROACH TO BRIDGING THE PRIMARY-SECONDARY TRANSFER GAP IN SCHOOLS**
Person to contact:	Dr. John Gardner School of Education The Queen's University of Belfast 69 University St. Belfast BT7 1HL, Northern Ireland Tel. 44 232 245 133 ext 7141 – Fax: 247 895
Duration:	From March 1990 to March 1992
Funding:	– South Eastern Education and Library Board (SEELB) – Apple UK
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In four schools, a central secondary school and three "feeder" primary schools:

– To examine how an educational theme (environmental education), developed in both primary and secondary schools, can provide a continuity of experience for pupils leaving primary and going into secondary-level schools.

Implementation:

The project is centred on the use of a CD-ROM disk, called Ecodisk, recently made available by the BBC. This is a re-working of a laser vision disk for interactive video. The material has been augmented both in terms of the textual material and also in the language of presentation (nine European languages are incoporated). Much of the material already exists, but both staff and pupils are being encouraged to create new materials.

The content of the disk is an ecological survey of a nature reserve, Slapton Leigh, in Southern England. The teaching materials centre on rôle-play activities where the pupils assume the rôles of people representing different groups with an interest in the site. These groups have contrasting and often conflicting requirements and include several clubs: a water-ski club, a fishing club, a birdwatchers' group, and so on.

The University's project input is largely advisory and evaluative. The work is being monitored both in terms of the materials being developed and the teaching/learning experiences involved.

Products:

Final report 1992

THE QUEEN'S UNIVERSITY OF BELFAST
SCHOOL OF EDUCATION

Title of project: PUPILS' LEARNING AND ACCESS TO INFORMATION TECHNOLOGY PROJECT (PLAIT)

Person to contact: Dr. John Gardner
School of Education
The Queen's University of Belfast
69 University St.
Belfast BT7 IHL, Northern Ireland
Tel. 44 232 245 133 – ext 7141 – Fax. 247895

Duration: January 1991 to December 1993

Funding: Department of Education for Northern Ireland

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In two primary and three secondary schools (not yet chosen):

- To examine the potential of "laptop" computers to assist in delivering the information technology requirements of the National Curriculum at the four key stages of a child's education (5-16 years);
- To study in depth the implications for change in teaching/learning approaches, classroom organisation and school resourcing

Implementation:

Classroom sets of "laptop" computers will be issued to selected classes. These will become the personal educational tools of these pupils, whose development and perfomance will be measured over the following two years.

Each school will assume primary responsibility for work in one of the main areas proposed, i.e. one school will do key stage 3 mathematics, another will look at key stage 1 writing and so on. Each school will also be providing activities for the chosen pupils across the curriculum.

The teachers in schools will be engaged in action research for Masters or higher degrees for which evaluative research and quantitative measurements are conducted by the University team. They will be able to choose between a taught modular degree or a full research degree. Their fees will be paid.

Products:

The project is being promoted as a "policy-informing" piece of research. The Department of Education for Northern Ireland will act upon the findings when allocating research funds for schools.

Final report December 1993

UNIVERSITY OF EAST ANGLIA
CENTRE FOR APPLIED RESEARCH IN EDUCATION

Title of project: PALM: PUPIL AUTONOMY IN LEARNING WITH MICROCOMPUTERS

Person to contact: Dr. Bridget Somekh
Centre for Applied Research in Education
University of East Anglia
Norwich NR4 7TJ, United Kingdom
Tel: 603 561161 ext 2633 – Fax: 603 259388

Duration: From September 1988 to August 1990

Funding:
- National Council for Educational Technology
- Local Education Authorities

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In twenty two primary and lower secondary (and some upper secondary) schools.

- To work in partnership with teachers to research the role of Information Technology in developing pupil autonomy in learning;
- To investigate the effectiveness of action-research as a means of teacher professional development in the Information Technology innovation.

Implementation:

PALM adopted an action-research approach which invited participant teachers to carry out research and curriculum development in the use of computers in education. Central team members participated in the research in classrooms and schools, collecting evidence of students' learning through classroom observation, as well as researching their own roles supporting teachers and students. Through a process of analysing and reflecting on the data, the teacher-researchers evaluated the learning taking place and planned for future lessons using computers, building in any changes they considered desirable to improve the quality of learning. In many cases, students played an important part in this research process either as informants or co-researchers.

Products:

Publications: "Teachers' Voices" (series presenting teachers' accounts of their research - 30 separate titles) and "Supporting Teacher Development Through Action Research"; a pack for advisory teachers. Palmleaves Newsletter during the project (six issues). Shared Perspectives (in preparation) to draw out themes and issues and present an overview of PALM work. PALM: The Inside Story, an account of how the project was set up and how it worked.

UNIVERSITY OF EAST ANGLIA
CENTRE FOR APPLIED RESEARCH IN EDUCATION

Title of project: PALM: PUPIL AUTONOMY IN LEARNING WITH COMPUTERS (Extension Project)

Person to contact: Richard Davies
University of East Anglia
Centre for Applied Research in Education
Norwich NR4 7TJ, United Kingdom
Tel: 603 561161 ext. 2633 - Fax: 603 259388

Duration: From September 1990 to March 1991

Funding: National Council for Educational Technology

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

The PALM Extension Project has been set up following the success of PALM phase one. It is a feasibility study leading to a possible PALM Three from April 1991.

Aims:

In primary and secondary schools (to be identified), three aims will be pursued:

- To work in partnership with teachers to research the role of Information Technology in developing pupil autonomy in learning (as PALM phase one);
- To investigate the effectiveness of action research as a means of teacher professional development in the Information Technology innovation (as PALM phase one);
- To explore to what extent PALM's methods can be integrated within the existing support structures for Information Technology in Local Education Authorities.

Implementation:

The Extension project builds on advisory teachers' existing expertise in supporting teachers. In order to obtain a high level of commitment, it was stipulated that all advisory teachers chose to join. Action research methods are introduced as appropriate, in consultation. This involves collecting data (using simple procedures such as interviewing, observing and journal writting) and using these as the basis for reflecting on practice and introducing any necessary changes. The project is not prescriptive in methodology but works within the guidelines of the PALM operating philosophy developed in the first phase of the project.

Products:

The final report will take the form of a proposal for further funding during the spring of 1991.

UNIVERSITY OF EXETER
SCHOOL OF EDUCATION

Title of project: HEALTH EDUCATION THROUGH INFORMATION TECHNOLOGY

Person to contact: Dr. Niki Davies
University of Exeter
School of Education
Exeter, Devon EX1 2LU
Devon, United Kingdom

Tel: 392-263263 – Fax: 392-411274

Duration: From March 1990 to March 1992

Funding:
- University of Exeter, School of Education
- Health Education Authority
- Schools

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To develop a software package on Health Education directly related to two cross curriculum issues in secondary education: Personal and Social Education and Information Technology . Two secondary schools were involved at the beginning of the project. All the secondary schools in the East Devon Health Authority are now participating.

Implementation:

The National Curriculum emphasises the cross curricular nature of Information Technology.

The software package developed contains data files for use in schools in their software and hardware. Teaching materials are cross referenced to other support material for alcohol education. Other areas of the National Curriculum may also be considered where they arise. In particular pupils, may be stimulated to develop their own questionnaires and look at mathematical aspects of handling data.

Products:

Very little data on the cross-curricular use of technology is available. It is proposed in the next phase to evaluate the teaching programme.

UNIVERSITY OF EXETER
GOLDSMITH COLLEGE, UNIVERSITY OF LONDON
LIVERPOOL POLYTECHNIC
CHESTER COLLEGE OF HIGHER EDUCATION
WORCESTER COLLEGE OF HIGHER EDUCATION

Title of project: INITIAL TEACHER EDUCATION AND NEW TECHNOLOGY (PROJECT INTENT)

Person to contact: Dr. Bridget Somekh
Co-ordinator of Project INTENT
Centre for Applied Research in Education
University of East Anglia
Norwich NR4 7TJ, United Kingdom

Duration: From September 1990 to September 1992

Funding: National Council for Educational Technology

Associated Universities: The five Institutions of Higher Education are involved in the Project.

BRIEF DESCRIPTION OF THE PROJECT

Aims:

To support and monitor the implementation of institutional policies for Information Technology. The Project is primarily concerned with:

1. Developing the quality of teaching and learning with Information Technology;
2. Providing support for lecturers integrating Information Technology across the curriculum for initial teacher training;
3. Developing management strategies to enable (1) and (2) above;
4. Monitoring the processes of institutional change.

Implementation:

A large number of primary and secondary schools are involved.

The INTENT central team is made up of senior managers and staff development tutors for IT in each Institution who are working with colleagues, students and local teachers to bring about the necessary institutional change at all levels.

INTENT has an educational rather than a technological focus, and is adopting a research approach to development, believing research and formative evaluation to be essential components of successful development work.

Products:

Case studies and associated research reports will be prepared. There will be an emphasis on sharing the practical and theoretical findings of the Project with colleagues in other Initial Teacher Training Establishments. In the second year of the project, an evaluation of the strategies developed will be produced.

UNIVERSITY OF LEEDS
SCHOOL OF EDUCATION

Title of project: CONCEPTUAL CHANGE IN SCIENCE

Person to contact: Prof. Rosalind Driver, R. Hartley
Directors
School of Education
University of Leeds
Leeds, LS2 9JT, United Kingdom
Tel: 532 334675 – Fax: 532 334683

Duration: From 1988 to 1991

Funding: – Economic and Social Research Council
InTER Programme

Associated Universities: – Glasgow University
– Open University

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In five lower secondary schools:

- To clarify and describe the process of change in the learners' conceptual understanding of natural phenomena;
- To develop and evaluate computer software which may be useful in exporing childrens' reasoning and promoting conceptual change in the domain of reasoning in mechanics.

Implementation:

The domain of reasoning in mechanics has been selected for study. The project considers that children seeking to understand and explain physical phenomena they encounter in the real world construct mental models of how the world behaves.

Two software systems have been developed to address childrens' prior conceptions. Both have been written in SMALL TALK. One program, called DM3 (Direct Manipulation of Mechanics Microworlds) is an interactive simulation of motion under force, allowing students to observe and manipulate both informally and in a structured experimental manner the behaviour of objects in motion. The other system, VARILAB, allows children to understand and develop views of physics. It enables students to build (graphically) small bodies and agents that act on them and runs dynamically showing changes (in speed, say, through time). The system itself is designed to point out inconsistencies and reasons if it is unable to "run" and illustrate an event.

Products:

The development and trial of software and the observation of pedagogical strategies appropriate to promoting the conceptual change process.

UNIVERSITY OF LONDON
INSTITUTE OF EDUCATION

Title of Project:	**A COMPUTER-BASED IN-SERVICE PROGRAMME FOR SECONDARY MATHEMATICS: THE MICROWORLDS PROJECT**
Person to contact:	Prof. Celia Hoyles Department of Mathematics, Statistics and Computing University of London Institute of Education 20 Bedford Way London WC1H OAL, United Kingdom Tel. 71 636 15 00 - Fax: 71 436 21 86
Duration:	From November 1986 to October 1989
Funding:	Economic and Social Research Council Local Education Authorities
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In three lower secondary schools:

- To develop, implement and evaluate a programme of in-service teacher education concerned with the use of generic computer applications within the secondary school mathematics curriculum.

Implementation:

The programme was designed to encourage teachers to: develop ways of structuring the computer environment within their mathematics classrooms and evaluate its role in terms of pupils' learning; design and implement a computer-based microworld for a specific area of the mathematics curriculum; reflect on their own learning processes and relate these to the learning of the pupils within their classrooms; confront the issues relating to the computer's influence on the role of the teacher, and to increase awareness of pupil learning styles; develop dissemination procedures within the school mathematics department.

Two 30-day in-service teacher training courses were held, over two years. They were evaluated from the point of view of the course itself and from the perspective of the teachers. In the third year, a computer-based microworld (the "Ratio and Proportion Microworld") was developed and evaluated. Software used was mainly LOGO, spreadsheets (EXCEL) with databases and graph plotting packages.

Some of the findings of the work influenced Information Technology and Education policy at national level.

Products:

Final report January 1990

UNIVERSITY OF LONDON
INSTITUTE OF EDUCATION

Title of Project: GROUPWORK WITH COMPUTERS

Person to contact: Prof. Celia Hoyles
Department of Mathematics, Statistics and Computing
University of London Institute of Education
20 Bedford Way
London WC1H OAL, United Kingdom
Tel: 71 636 15 00 - Fax: 71 436 21 86

Duration: From September 1988 to December 1991

Funding: Economic and Social Research Council

Associated Universities: University of Sussex

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In six primary and lower secondary schools located in Bedfordshire, Essex and Middlesex:

- To learn, as teachers, how to exploit rather than ignore the potential of working in groups with computers (groupwork);
- To assess the potential of group work for the enhancement of learning;
- To identify the learning goals and tasks for which groupwork is likely to be more effective.

Implementation:

The project attempts to throw light on the general problematic of effective groupwork with computers. Scarcity of computers is likely to make working in groups a practical necessity for many years ahead. The main issues are:

- For what types of learning goal is groupwork with computers most appropriate?
- What is the potential contribution to the curriculum?
- How can computer and non-computer based tasks be designed for groupwork?
- Is it possible to identify criteria for task design, group management and their interrelationships, for effective groupwork to be established?
- What kinds of groups are best for achieving particular goals?
- How can such groupwork best be prepared for, implemented and evaluated?
- Is training in groupwork a significant advantage?

The associated University of Sussex focuses on macro issues and the University of London Institute of Education on micro issues, such as the relationships between context variables, group processes and pupil attitudes and learning; the effects of varying the computing environment and the learning tasks, the pupils' psychological characteristics and their variance or invariance; group size and competition, to gender effects, to teacher intervention strategies and to the effect of prior training in co-operative groupwork and/or experience of groupwork off the computer.

Products:

Final report February 1992.

UNIVERSITY OF LONDON
INSTITUTE OF EDUCATION

Title of project:	**COMPUTER BASED MODELLING ACROSS THE CURRICULUM**
Person to contact:	Prof. Celia Hoyles Department of Mathematics, Statistics and Computing Institute of Education University of London 20 Bedford Way London WC1H OAL, United Kingdom Tel. 71 636 15 00 – Fax: 71 436 21 86
Duration:	From April 1989 to March 1992
Funding:	Government Training Agency
Associated Universities:	None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In five lower and upper secondary schools:

- To focus on the use of the computer as a tool for modelling in a variety of subjects - initially mathematics, business studies, science and geography - and cross-curricular activities;
- To facilitate understanding of human and physical systems by providing tools which allow a quantitative perspective.
- To use modelling with teachers in order to develop curriculum materials for classroom use which will also serve as vehicles for staff development.

Implementation:

Many industrial applications use computer modelling and the project will encourage the same collaborative styles of working in the classroom that are often used in industry. The main features of the project will be: to enhance aspects of the current curriculum which involve the modelling of physical and human systems; to construct and use models with the same generic software (e.g. spreadsheets) within the context of the different subjects and through cross-curricular acivities; to develop independent and group learning; to design and evaluate materials for teacher development; to disseminate materials within and beyond the Chiltern Region.

The Project is developed in co-operation with five Local Education Authorities and the Advisory Unit for Microtechnology in Education.

Products:

Final report April 1992.

COLLEGE OF ST. MARK AND ST. JOHN
CENTER FOR INFORMATION TECHNOLOGY IN EDUCATION

Title of project: AN EXEMPLAR OF PROGRESSION IN IT THROUGH A CROSS-CURRICULAR THEME

Person to contact: Dr. John Couplan
College of St. Mark and St. John,
Derriford Road, Plymouth PL6 8BH, United Kingdom
Tel: 44.752.784619 – 44. 752.786622

Duration: From April 1990 to March 199292

Funding: Department of Education and Science

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In five schools (2 primary, 3 secondary) to support teachers in:

1. Pursuing the development of IT capability in the context of a cross- curricular theme, **environmental education** (water);
2. The integration of IT into the curriculum;
3. Identifying progression in IT by use of a single IT package in complex situations (Excel);
4. To develop a teacher programme usable in addressing clusters of the attainment targets of the National Curriculum.

Implementation:

Exemplars will be provided, for three of the key age stages of the National Curriculum [Key Stage 2 (8-11), Key Stage 3 (12-14) and Key Stage 4 (15-16)]. Excel will be configured to provide three levels of access appropriate to each of the key stages 2, 3, and 4.

A range of statements of attainment will be addressed from the published documents in English, Mathematics, Science, Technology, Geography. Analysis of these documents indicates clusters of statements relating to this topic fall into two groups: a) Skills and b) Knowledge and concepts.

Products:

Support materials for the following groups will be developed: Pupils; Teachers; In-service providers; Initial teacher trainers. For each of the key stages, these stand alone materials will clearly indicate the cross-curricular links provided by environmental education.

UNIVERSITY OF SUSSEX
INSTITUTE OF CONTINUING AND PROFESSIONAL EDUCATION

Title of project:	**WHOLE SCHOOL DEVELOMMENT IN INFORMATION TECHNOLOGY**
Person to contact:	Prof. Michael Eraut Education Development Building University of Sussex Falmer Brighton BN1 9RG, United Kingdom
Duration:	From October 1988 to September 1991
Funding:	– Employment Department Group's Training Agency – Training, Enterprise and Education Directorate of the Employment Department Group
Associated Universities:	Brighton Polytechnic

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In sixteen secondary schools:

- To develop and disseminate in-service teacher training strategies and materials of proven effectiveness in information technologies in the following areas:
  1. Whole school policies for information technology;
  2. School management of information technology;
  3. School focused staff development in information technology.

Implementation:

The project represents an advanced stage in the evolution of information technology in schools, in placing importance on developing whole school policies which would not only state aims, but also provide plans and targets for action. Such a policy would cover the curriculum, school administration, resource management, finance and staff development. The team explores means of constructing and implementing such a policy, offering ideas and approaches drawn from previous experience and contributing expertise in curriculum develoment, whole school review and methods of self evaluation. Supporting materials were tested and modified within schools and on courses.

Products:

Shared accounts of how a school policy evolves will contribute to a map of policy options which will guide other schools' decisions.

Final report September 1991.

Publications: Decisions Guide 3 IT Policy Papers (January 1991). Videotape "Getting IT Right" (April 1991).

UNIVERSITY OF SUSSEX
INSTITUTE OF CONTINUING AND PROFESSIONAL EDUCATION

Title of project: GROUPWORK WITH COMPUTERS

Person to contact: Prof. Michael Eraut
Education Development Building
University of Sussex
Falmer, Brighton BN1 9RG, United Kingdom
Tel: 273 67 80 39 - Fax: 273 67 84 66

Duration: From September 1988 to December 1991

Funding:
- Economic and Social Research Council
- Local education authorities

Associated Universities: University of London Institute of Education

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In six primary schools (9-12 years), located in West Sussex, East Sussex and Surrey:

- To learn, as teachers, how to exploit rather than ignore the potential of working in groups with computers (groupwork);
- To assess the potential of groupwork for the enhancement of learning;
- To identify the learning goals and tasks for which groupwork is likely to be more effective.

Implementation:

The project attempts to throw light on the general problepatic of effective groupwork with computers. Scarcity of computers is likely to make working in groups a practical necessity for many years ahead. The ma[illegible] issues are:

- For what types of learning goal is groupwork with computers most appropriate?
- What is the potential contribution to the curriculum?
- How can computer and non-computer based tasks be designed which facilitate groupwork?
- Is it possible to identify criteria for task design, group managment and their interrelationships, for effective groupwork to be established?
- What kinds of groups are best for achieving particular goals?
- How can such groupwork best be pre[illegible]for, implemented and evaluated?
- Is training in groupwork a significa[illegible]ntage?

The University of London Institute Education focuses on micro issues and the University of Sussex on the above macro issues.

Products:

Research reports in December 1990 written by teacher researchers. Final report December 1991.

WEST SUSSEX INSTITUTE OF HIGHER EDUCATION
MATHEMATICS CENTRE

Title of project: DEVELOPING MATHEMATICS WITH MICROCOMPUTERS

Person to contact: Adrian Oldknow
Principal Lecturer
West Sussex Institute of Education
Upper Bognor Road
Bognor Regis
Sussex, PO21 IHR, United Kingdom

Duration: Ongoing

Funding:
- Staffing by: Department of Education and Science; Microelectronics Education Project; Training Agency; Nuffield Trust.
- Hardware by: National Advisory Body; Department of Trade and Industry

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In six schools (primary, lower secondary and upper secondary), in the use of computers in mathematics, information technology, special needs and science:

- To improve access to information technologies for teachers and students;
- To develop teachers' professional ability;
- To develop fluency and discrimination in the use of computers in mathematics.

Implementation:

This is not one single project but a continuing synthesis of a number of projects, reflecting matters of concern both nationally and to the Centre. Research into the use of IT in mathematics has been conducted for low-attaining pupils within the LAMP (Low Attainers in Mathematics Project). The Centre had taken its own development aims from these researches.

The Centre had initiated a variety of in-service programmes for teachers ranging from one term full-time, to twenty days over a school year, as well as producing curriculum developments in the uses of information technology in initial teacher training. These have focused on the changing nature of mathematics itself because of the impact on IT and on different models of student learning and interaction.

Current activity is focused on the role of information technologies with new courses of A-level mathematics (16-19 years) with the Nuffield Advanced Mathematics Project.

Products:

Material and programs to fit the national curriculum.

United States

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ARIZONA STATE UNIVERSITY
TECHNOLOGY BASED LEARNING AND RESEARCH

Title of project: TEACHING MATH[illegible] METHODS USING INTERACTIVE VIDE[illegible]

Person to contact: Prof. Gary G. Bitter
Technology Based Learning and Research
Arizona State University
Payne 148
Tempe, Arizona 85287-0111, United States
Tel: 602965-3322 – Fax: 602965-8887

Duration: 1989 to 1991

Funding:
- National Science Foundation
- IBM (equipment)

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In primary and middle schools (Grades K-8) of Tempe:

- To improve elementary mathematics instruction.

Implementation:

This goal is accomplished by the development of an interactive videodisc instructional program that will more effectively prepare pre-service teachers to integrate content, manipulative devices, and methods in their mathematics teaching.

The program provides a unique opportunity to observe and analyze model teaching and student behaviour in actual classrooms, a virtual field experience. It will be used by university professors to demonstrate exemplary math teaching methods to pre-service teachers, and by the pre-service teachers themselves for individual and group study. Sophisticated database indexing allows users to access segments according to flexible selection criteria.

The program includes a university professor modeling mathematics instruction using manipulative devices (base 10 blocks or geoboard), and exemplary elementary teachers using these manipulatives with their first, third, or fifth grade students. These segments show classroom experiences of large group instruction, cooperative and peer group learning, and individualized learning.

The formative evaluation of the instructional program emphasizes qualitative data collection and analysis, primarily interviews with preservice teachers after their initial period of exposure to the program. The summative evaluation emphasizes differences in cognitive gain, attitude, and classroom behaviour of groups of preservice teachers differentially exposed to the program.

Products:

Final report 1992.

COLUMBIA UNIVERSITY
TEACHERS COLLEGE

Title of project: ELECTRONIC LEARNING LABORATORY

Person to contact:
Dr. Mary Alice White
Electronic Learning Laboratory
Box 426
158 Taconic Road
Salisbury, CT 06068, U.S.A.
Tel. 203 - 435 9121 – Fax: 203 - 135 8160

Duration: From 1982

Funding:
- University
- Private sector

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In pre-primary, primary lower and upper secondary public schools in Connecticut and in the United Nations school in New York:

- To evaluate new product software;
- To analyse the use of technologies in education.

Implementation:

The Laboratory carries out a range of projects: empirical research on the new technologies in schools; evaluation of software products in development: evaluating existing software; publication of articles on the uses of technologies in education; raising policy issues.

Products:

Published articles.

UNIVERSITY OF ILLINOIS
COLLEGE OF EDUCATION

Title of project: URBANA YEAR-LONG PROJECT

Person to contact:
Sheryl Benson
College of Education
Department of Curriculum and Instruction
University of Illinois
1310 S. Sixth Street
Champaign, IL 61820, United States

Duration: From August 1989 to May 1990

Funding: College of Education

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

In elementary schools in the Urbana School District:

- To improve the preparation of school teachers of kindergarten through sixth grade (5-11 years).

Implementation:

The elementary school teachers are assigned to a teacher/advisor within a school and are given three lengthy clinical experiences under the guidance of classroom teachers and university personnel. In addition, the students receive instruction in language and literacy, content area subject, curriculum and instruction, and mathemathics. These courses, taught collaboratively by an instructional team of Urbana teachers and University Faculty members, provide opportunities to relate clinical practice to method work. Students' course work and field experiences are designed and implemented by the four instructional teams. Each student's development and progress is monitored by a joint teacher/Faculty team.

The Advisory Committee meets regularly (it consists of student teachers, public school teachers, Faculty members and principals).

Products:

Report to be instrumental in training primary school teachers.

Final report of first year December 1990.

UNIVERSITY OF MARYLAND
CENTER FOR INSTRUCTIONAL DEVELOPMENT AND EVALUATION

Title of project: INSTRUCTIONAL FRAMEWORK

Person to contact: Dr. Scott Burg
Centre for Instructional Development and Evaluation
University of Maryland
University Boulevard and Adelphi Road
College Park, Maryland, United States

Tel. 20742-1616

Duration: From May 1990 to June 1991

Funding:
- Chapter II Federal Grant
- Maryland State Department of Education
- University of Maryland

Associated Universities: None

BRIEF DESCRIPTION OF THE PROJECT

Aims:

At all levels of the curriculum, from pre-primary to adult education:

- To develop a multimedia interactive resource for teachers called the Instructional Framework;
- To help contribute to the expansion and refinement of a teacher's repertoire of teaching strategies while guiding instructional decision making.

Implementation:

The schools have not yet been selected: it is planned to include a rural, suburban and urban school.

The Instructional Framework consists of three major components: an electronic database containing information related to effective instruction; an electronic communications link to state and national bulletin boards; a series of videotaped illustrations of research-based teaching behaviours and expert testimony that is accessed via interactive videodisc.

This delivery system to be set up at different school sites, will allow teachers to maintain a measure of control over their own professional development in technology integration in classrooms. Information accessible through the system will be available at times convenient to the teacher and can be explored according to the teacher's needs and individual schedule. Information on particular instructional strategies can be accessed through a number of different variables: learning level (grade), content area, special population and instructional emphasis (a particular content topic).

The project will also be piloted at a staff development centre and one or two education and training facilities.

Products:

Final report summer 1991.

UNIVERSITY OF PITTSBURGH
PITTSBURGH REGIONAL COMPUTER RESOURCE CENTER

Title of project:	**INFORMATION TECHNOLOGY FOR THE COMMONWEALTH OF PENNSYLVANIA**
Person to contact:	Dr. Albert P. Nous PITT-RCRC University of Pittsburgh 1N10 Forbes Quadrangle Pittsburgh, PA 1520, USA
Duration:	From November 1984 to June 1992
Funding:	Pennsylvania Higher Education Assistance Agency
Associated Universities:	– Clarion, Lehigh, Penn State, Temple – and West Chester Universities

BRIEF DESCRIPTION OF THE PROJECT

Aims:

For K-12 grade pupils (5-18 years) in 41 public school districts (public, private and parochial schools) in the Commonwealth of Pennsylvania:

– To raise the computer literacy of the teachers.

Implementation:

The Pittsburgh-Regional Computer Resource Center began operation in 1984, and is one of fourteen RCRCs located across the State of Pennsylvania. It was chosen as a site to introduce computers into the mathematics/science curriculum. The Centre has offered microcomputer speciality courses and workshop for science teachers in topics such as interactive video, laboratory interfacing, computer simulation, tele-communication, desktop publishing and developing higher order thinking skills using a database. Since then, additional courses have been instituted using software packages in art, biology, business, careers, chemistry, English, mathematics, science, reading, social studies and language arts, as well as for word processing, database and spreadsheets. Equipment includes the Apple IIe, IIc, IIGS, Macintosh II, IIX with Graphic Scanner, Macintosh Plus, Macintosh SE, IBVM, PC, Commodore Amiga, Tandy 1000 and 3000 anc NCR (IBM compatible). The hardware demonstrates Appleshare and Digicard Network systems. There are tele-communication systems, a color plotter, digitizer, interfacing peripherals and software, interactive video systems and CD-ROM technology.

The legislative mandate of the Centre is service. Research conducted is a complementary activity only engaged in by Universities housing RCRCs. The PITT-RCRC works in close conjunction with the Buhl Science Center and the NASA Teachers Resources Center. The Pennsylvania Regional Centre for Science Teachers is now housed at PITT-RCRC. This program received strong support from the State legislature.

Products:

Quarterly reports, for each year of operation.